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VOLUME XIII APRIL 21, 1924 NUMBER 6

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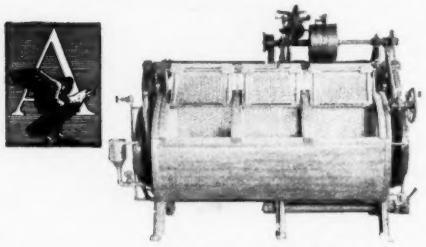

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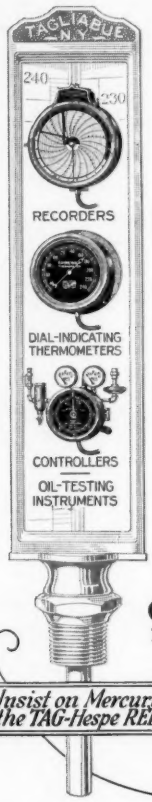

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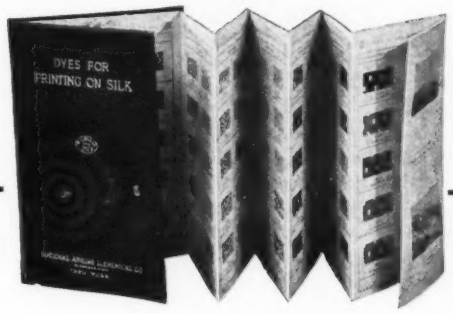

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VOLUME XIII NEW YORK, APRIL 21, 1924 NUMBER 6

The Dyeing of Hosiery*

Single and Combination Fibers—The Colors Used for Various Combinations—Co-operation Between Dyeing and Knitting Departments—Selection and Control—The Final Effect—Cotton in Combination with Artificial Silk—The American Dye Industry Appeals to American Textile Men

By ELVIN H. KILLHEFFER

Vice-President, Newport Chemical Works, Inc.

THE dyeing of hosiery is a rather large subject and I do not propose to attempt any complete or detailed discussion or description of all the processes involved.

During the last few years new complexities have been introduced which are very fertile producers of dyeing difficulties, and I shall address myself chiefly to these as being perhaps the most interesting and at the same time the most troublesome phase of the work in your dyeing departments.

According to some of the notices of the meeting which I have seen, the subject of bleaching was to be included in my remarks. This was undoubtedly a mistake as dyeing alone is sufficiently large as a subject for anyone.

From the standpoint of the dyer the simplest work he has to deal with is that where only a single fiber is involved as either all cotton, all wool or all silk.

In each of these cases the dyeing operation is comparatively simple and follows the usual rules for the dyeing of the respective fiber in other forms.

Trade requirements demand, however, that combinations of various fibers shall be used and for varying reasons. The most common combinations of fibers are cotton and silk, cotton and wool, and cotton and artificial silk.

More complex mixtures are the following:

Cotton, wool and silk.
Cotton, silk and artificial silk.
Cotton, wool and artificial silk.

Cotton and silk mixtures are dyed principally with direct colors with the addition of some acid or neutral dyeing colors to fill up the silk or tone its shade. Black is dyed with either a developed or a direct black, depending on the degree of fastness desired.

Cotton and wool mixtures are dyed with union colors, i. e., combinations of direct dyeing cotton dyes, and neutral dyeing wool dyes specially compounded to produce solid shades which will be the same on both cotton and wool. Cotton and artificial silk mixtures are dyed with direct dyeing cotton colors.

Now the real dyeing difficulties arise when the second and more complex class of combination of fibers is used. It may be well to consider for a moment the reasons for these mixtures of fibers. We may sum these up as follows:

Attempts to lower costs.
Imitations of better qualities.
Desire for novelty or decorative effects.

Just at this point I want to point out to you something the importance of which cannot be overestimated.

There should be the greatest co-operation between the designer or styler, or knitter or whoever is responsible for the composition of the stock and the dyeing department. Very often the dyeing department can offer suggestions as to either composition or arrangement of the fibers that will so simplify the work in the dyehouse as to mean the saving of a good deal of money.

If, on the other hand, there is little or no co-operation at this point, then the stock is manufactured to the specifications demanded by the cost which is to be had or the ideas of the designer as to composition or perhaps both considerations.

The finished stock then reaches the dyehouse for the most important operation of all if the goods are to sell and furthermore give satisfaction after being sold.

Now the more complex is the mixture of fibers, the more difficult is the selection of colors which will satisfactorily and evenly color them. The differing affinities of the different fibers for the dyes must be taken into account, and such dyes used in combination with each

*An address delivered before the National Association of Hosiery and Underwear Manufacturers, April 9, 1924.

other as will overcome these differing affinities. Not only must the dyes be carefully selected, but the temperature often must be so manipulated as to obtain the desired result.

A second consideration then naturally follows, which is that the more varied the dyeing recipes are, the more accurate control of the dyeing process is necessary. When you consider the type of apparatus in many of our dyehouses, you will realize at once the difficulties there are in the way of accurate control. Certain it is that accurate control of the kind necessary in, let us say, the chemical process of the manufacture of the dyes themselves, is not often possible in a dyehouse.

Both the proper selection of dyes and the question of accurate control of the process are of particular importance when it comes to the question of shading on one or more fibers in the mixture.

Now how does this affect the final product of your mills?

1.—Very often poorer fastness is an inevitable result because the dyes necessary to color all of the mixed fibers uniformly are often of only moderate fastness.

In this connection greater co-operation between knitting and dyeing departments is of great value, for very often some slight alteration in the proportions of the fibers will profoundly affect the dyeing process.

2.—Another result is the loss in the dyehouse of the saving effected in the construction of the material. This loss may be because of the particular dyes made necessary, the unavoidable waste of dye in the difficult process of dyeing and shading, and the longer time required to get out the batches which in turn results in lower production.

3.—Finally all of the foregoing considerations lead to the important one of wearing qualities after the article reaches the ultimate purchaser.

If in order to get the particular shade or effect that was desired it was necessary to use colors with only moderate or perhaps even poor fastness, then the ultimate purchaser is disappointed because the colors perhaps run in washing or are very poor in their fastness to perspiration, or if on the other hand it is necessary to do quite considerable shading, which means a longer handling of the material in the dye bath, then the artificial silk contained in the mixture may be tendered to some extent or the appearance of the stock itself may not be good.

It would almost appear as though sometimes the manufacturers expect impossibilities in the dyehouse, and I refer now to some of the combinations of mixed fibers which are expected to come out of the dyehouses in solid shades and with no variation in tone between the component fibers.

Broadly speaking, the direct cotton dyestuffs are the chief reliance of the dyer for the coloring of these mixed fiber hose.

Where multiple color effects are desired the use of the different fibers makes possible an almost endless number of interesting effects because of their different affinities for dyes as before described.

If for the moment we exclude wool and silk from our consideration just see what possibilities there are in the use of cotton in combination with one or several varieties of artificial silk.

Briefly, the principal artificial silks are: Cuprammonium, nitro, viscose and acetate. The nitro and viscose are probably most used and best known at the present time in this country, but acetate silk is extremely interesting because of its much superior wearing properties and its use is sure to increase rapidly. In the case of acetate silk there are two separate and distinct commercial products on the market at the present time, one known as Lustron and the other as Celanese.

Nitro (Tubize) and viscose are both readily dyed with direct cotton colors, but the acetate silks have little or no direct affinity for much else besides basic dyes, and even with these the two qualities of silk have quite different affinities.

For your inspection I have just a few examples showing how differently and how selectively dyes take on mixtures of fibers.

You can readily see the possibilities as well as the difficulties to be encountered in the dyehouse because of the facts I have tried to bring out, and I may point out once more that the possibilities may be increased and the difficulties decreased if you will make up your various styles and combinations by and with the advice and help of the dyer who must afterward satisfactorily dye them.

You already know that all of the dyestuff suppliers maintain laboratories and experienced men, and that both are at your service for the working out of problems of this or any other nature.

In closing I want to address just a few words to you from and as an American manufacturer of dyes.

You very reasonably expect the American people to buy hosiery and underwear of your manufacture, nor could you exist were you wholly dependent on foreign trade. The American manufacturer of dyes doesn't have a commodity to sell the entire American people, but is dependent entirely on you as consumers of his product. Whether he remains as one of the industries serving your larger one, therefore, is largely in your hands. We have and are now working to increase the number of products we make and which you need. If there is something you require which is not now on the market, cooperate sufficiently with us to tell us what it is so that we in turn can get to work on it.

The American dye monopoly that some folks would have you believe is a probability is in fact an utter impossibility because of our basic laws. The monopoly of our German competitors is an accomplished fact. We are agreed that monopolies anywhere are detrimental. A foreign one we can't even control.

The purpose of these few remarks is simply this: We need your support.

Developing Indanthrene Blue

Production of Para Red on Indanthrene Blue—Developing Chloranthrene Blue BD—Dyeing with Pyranthrene Dyestuffs

By J. POKORNY

(*Textilberichte*, 1923, *pages* 583-584)

Translated by Ismar Ginsberg, B.Sc., Chem. Eng.

THE vat dyestuffs, and in particular the indanthrene coloring matters in the broader sense, are known to occupy a dominant position in the textile dyeing field, and if all the signs are not deceptive we will see in our time a rapid decline in the use of the mordant dyestuffs and their replacement by the vat dyes. When the series of vat dyestuffs are completed by the discovery of a red with the intense color and fast shade of Alizarine Red, then the dyestuffs of the vat series will be satisfactory for most of the purposes to which dyes are put in textile work, not only in printing textile fabrics but also in dyeing them. The greater ease of employing the vat dyes for these purposes will render them much more advantageous to the dyer and the printer than any of the other coloring matters.

There has been quite a considerable amount of literature published on the methods of using the individual members of the indanthrene series of dyestuffs. These dyestuffs have been changed in composition to some extent by various dye manufacturers, and, as is well known, only the fastest of them, which are known as "indanthrene colors," have had any vogue at all. The various color houses which manufacture these dyes furnish detailed information concerning their use and many articles have appeared in technical literature on the same subject.

So far as the dyeing of cotton piece goods with Indanthrene Blue is concerned, the author has had considerable experience along this line. He has found that in the dyeing process, in which Para Red was used in resist printing on the dyed fabrics, sodium bichromate oxidizes this blue to a green, and then the green that is produced in this manner can again be changed back into the correct blue shade by a slight treatment with hydrosulphite.

Production of Para Red on Indanthrene Blue

The presence of potassium bichromate in resist printing is not only useless but it is actually harmful, as it causes the formation of greenish spots on the cloth. These spots can, of course, be removed by passing the cloth through a dilute solution of sodium hydrosulphite of 30 to 40 deg. Be. (or, better still, by steaming). But this treatment lessens the brilliancy of the red that has been printing on the blue-dyed cloth, and the color must then be freshened up again by passing the cloth through a dilute solution of hydrochloric acid. The author has also found that manganese chloride exerts just as satisfactory and as efficient a resist effect as a mixture of manganese chloride and potassium dichromate.

An important process for printing red resist designs on Indanthrene Blue dyed fabrics is described in Austrian Patent No. 40,412. The ink preparation used in printing the fabric, which is first treated with a naphthol-alkali mixture, consists of a thickened mixture of a soluble manganese salt, preferably manganese chloride, an oxidizing agent and a solution of a diazo compound. Such a mixture has, for example, the following composition:

250 parts of tragacanth thickening.
500 parts of manganese chloride.
27 grams of sodium dichromate.
55 grams of sodium acetate.
168 grams of a diazo compound.

On the other hand, the resist composition recommended by the Badische Company contains 400 parts of manganese chloride and 20 parts of potassium dichromate to every 1,000 parts of the printing paste.

Developing Chloranthrene Blue BD

The author found that in developing a cloth which has been dyed with Chloranthrene Blue BD, much better results are obtained by just steaming the cloth with or without the use of pressure for about thirty minutes. Comparative results with glycerine, glucose, perborates and hydrogen peroxide showed that just as good results were obtained with simple boiling with water as when these substances were used in addition. Prolonged steaming of the goods printed with Indanthrene Blue makes the dye more fast to chlorine, or else it gives a blue coloration which is changed into a greenish tone by the action of the chlorine and then back again into the right shade.

It has also been found that when the indanthrene dyestuffs are employed in the dyeing of yarn, the colors produced by these dyestuffs are given a more reddish and brighter tone by treating the yarn with a boiling soap solution, while similar effects are obtained by digesting the color with water for a period varying from fifteen minutes to half an hour. This effect may also be produced by the action of steaming with or without pressure.

Dyeing with Pyranthrene Dyestuffs

It has also been found that in dyeing with the pyranthrene dyestuffs an improvement in the color produced is

obtained by cooking the fabrics with a soap solution. The author himself has found, in working with quite large amounts of red or reddish-white resist-printed piece goods dyed with Indanthrene Blue, that this blue becomes stronger and more brilliant after the piece goods are cooked for a rather prolonged period of time with a soap solution. For this reason he made an experiment to see what the effect of steam alone would be. It is noteworthy that in the case of mercerized fabrics the bluish tone does not become more intense after the steaming process, but it does brighten up considerably. The author has also found that the blue which he obtained in a deeper shade by the action of steaming became weaker when the cloth was calendered in the hot Schreiner calendering machine. It is possible that the result of the prolonged soaping treatment or the steaming is not one of oxidation but depends on the formation of a saturated but unstable compound between the dyestuff and the cellulose molecule and water. This, to be sure, may be considered as possible only in the case of non-mercerized fabrics, for mercerized cotton reacts differently with the dyestuff due to its chemical and physical difference from ordinary cotton fiber.

Translator's Note

It was mentioned first that in resist printing sodium bichromate is used as well as manganese chloride, although not so much of the former substance is employed as the latter. The author of the article mentions that the reason for this is that the dichromate acts as an auxiliary resist. The writer agrees with him in this respect when he states that such an addition would be fraught with danger to the indanthrene ground. This does not happen in the case in question. In printing goods which contain alkali in addition to naphthol with the resist composition containing manganese chloride and sodium bichromate, the manganese chloride is first decomposed into manganese hydroxide, which, however, appears to be rapidly oxidized by the sodium bichromate which is present in the mixture. This may be gathered from the fact that printed cloth quickly becomes brown, and not as quickly as takes place when the resist is used without the adoption of the bichromate.

However, just what takes place in this process does not appear to be entirely clear. For example, if one considers that in the simultaneous printing of manganese chloride and sodium bichromate on the alkaline-treated goods either the manganese chloride is converted into manganese hydroxide or the sodium bichromate is converted into sodium chromate. Or, again, both these reactions may be considered as taking place simultaneously. The result is that the process takes the aspect of one of considerable complexity. However, one thing is sure, and that is that after the printing of the fabric has been carried out there is scarcely any unchanged sodium bichromate present. Furthermore, there is undoubtedly a reaction between the bichromate and the manganese hydroxide that is formed during the course of the printing process. And when it is recalled that in the oxidation of the manganese hydroxide, which is formed by the decomposition of the manganese chloride by means of the bichromate compound, there is formed a compound which has been found to have the formula $2MnO_2.Cr_2O_7$, which corresponds, in composition at any rate, to the so-called "balance bister," then the presence of such a substance in the resist process must be expected. There is no question but that sodium bichromate is consumed in producing this substance.

ALIZARINE EMERALDOLE G

Under the above designation, the Grasselli Chemical Company announces the domestic manufacture of this well known color. The shade is a trifle bluer, but the strength, properties and chemical reaction of the domestic product are the same as the imported type.

Alizarine Emeraldole G is best dyed with an addition of Glauber salt and acetic acid, using a small amount of sulphuric acid, if necessary, to exhaust the dye bath, and when so dyed is very easily level dyeing and penetrates well. It is equal to, if not superior to, the well-known Alizarine Cyanine Greens in level dyeing and penetration. The fastness to acids, carbonizing, perspiration, crabbing and steaming is very good. The shade is not affected by the presence of metals in the dye bath. The fastness to washing is very good, and it will stand a moderate fulling. The fastness to light is excellent, but it fades slightly duller, losing the yellow cast. On prolonged exposure, it is fully equal to the Alizarine Cyanine Greens. Cotton effect threads are unstained and silk effect threads are barely tinted. By after-chroming the shade goes much yellower. The color is well adapted for self shades and combinations with Alizarine Blues, Alizarine Rubinoles and Fast Light Yellows for use on slubbing, yarns, ladies' dress goods and carpet yarns. It can also be used on silk and if after-treated with chrome and acetic acid, the resulting shades are fast to water and washing. It can also be used to advantage for lakes.

ALLIED CHEMICAL & DYE CORPORATION EARNINGS GREATER

The report of the Allied Chemical & Dye Corporation and subsidiaries, covering operations for the year ended December 31, 1923, shows a gross income, after providing for depreciation, absolescence, repairs, etc., of $21,974,557, as compared with $17,280,368 for 1922. After the payment of the preferred dividends there was a net income of $19,148,471, against a net income of $15,114,955 for the year previous. The dividends on both stocks totaled $11,366,839, making the surplus as of December 31, 1923, $134,209,967, as compared with $126,428,336 at the close of 1922. The current assets of the company of December 31, 1923, totaled $101,260,782, and the current liabilities $9,930,778, whereas at the close of the year previous the current assets amounted to $86,850,334, and current liabilities $14,348,445.

Scientific Washing

Part VII - Bleach

Bleach Does Not Remove Impurities—Time and Amount for Good Bleaching—What the Oxidizing Bleaches Are—Why Ozone Is a Good Bleacher—The Chlorine Bleaches—How Bleached Color May Be Restored—The Story of Bleaching Powder—Where Bleaching Powder Is Used

By F. H. GUERNSEY
Chief Chemist, Cowles Detergent Company

TO bleach means to whiten. It is for this purpose that so-called bleaches or whitening agents are employed in the power laundry and textile industries. Bleaching is purely a chemical process which brings about a change in the composition of dark colored matter which impairs the general appearance of the fabric.

There are essentially two great classes of matter, organic and inorganic. The mineral constituents of the earth, such as iron, lime, magnesium, sodium, potassium, are termed inorganic materials. Materials derived from organized things involving life, are termed organic materials. Examples of these are the textile fibers (with exception of asbestos which is a mineral fiber), fruit stains, fats, oils, etc.

Some compounds contain both organic and inorganic constitutents, fat soap for example. This substance is about 90 per cent fatty base and 10 per cent mineral base. On account of the fact that the organic portion of this compound predominates in quantity, it is considered an organic compound. There are many similar cases, where it is more difficult to say just what designation should be given.

The great majority of staining substances are of organic origin, or at least contain a large amount of organic material. Most of the organic staining agents found as dirt on fabrics are subject to a change chemically, by common (oxidizing) bleaching agents, but there is no hard and fast rule to be applied. On the other hand, the inorganic stains are usually intensified by ordinary bleach, and an oppositely acting (reducing) bleach, or a solvent action, is most effective in removing them.

Bleach Does Not Remove Impurities

It should be understood that the change in composition which we term "bleaching" does not necessarily mean elimination of the discoloring substance from the fabric or fiber. In some cases a soluble compound is formed which is easily rinsed out of the fabric. But for the most part, the bleaching merely changes the color from the undesired darker shades to white.

In some cases the change is not even permanent. For instance, a discolored piece of goods may be decolorized (whitened) by the use of a reducing bleach, to the production of a satisfactory white. Upon exposure to the air, this same piece of goods may become discolored again by absorption of oxygen from the atmosphere. Again, a piece of goods, bleached white by an oxidizing bleach, may be darkened again by treatment with a reducing sour.

It should also be understood that there are many forms of discoloring agents which are unaffected by bleach in the general sense of the term. These are usually of a mineral nature, and are removed or decolorized by other means such as solvents, etc.

The process of bleaching, as generally conducted, is perhaps the most destructive of the various chemical treatments in the washroom, and is in no small measure responsible for the distrust which many housewives hold in the power laundry.

Even scientific writers have bluntly referred to this subject; one author in describing the use of Javelle water (ordinary soda bleach) stating, "A one-half per cent solution is used—in modern laundry practice with the well known *rotting* effect upon fabrics."

Though many launderers regard bleach as a necessary evil, much of the seeming need for its use may be eliminated by proper methods of washing.

Time and Amount for Good Bleaching

In standard laundry practice, prolonged exposure in the bleaching bath is a menace to the mechanical strength of the fabric. In consequence, three highly important considerations confront the user of bleaches:

1st—Concentration or strength.
2nd—Temperature.
3rd—Length of exposure of goods to bleaching action.

Two quarts of the standard "soft" bleach (sodium hypochlorite) in three inches of water (36 x 54 wheel) is sufficient for bleaching under general conditions. Never use more than the minimum amount which experience has shown will do the work. It has been found that a five-minute bleach at 120 to 160 deg. Fahr. will produce satisfactory bleaching action. A longer exposure at any temperature, or a greater concentration, is neither necessary nor advisable.

When bleaching in the suds a higher temperature and lengthy exposure is usually given because of conditions.

To prevent this the addition of bleach is frequently withheld until about 10 minutes before the bath is discharged.

It is much safer, and correct bleaching is obtained, when the bleaching is done in one of the rinses after the suds, at a lower temperature, and for a shorter period of exposure (not over 10 *minutes).*

How Bleaches Are Classified

There are essentially two kinds of bleaches:

(a) Oxidizing bleaches.
(b) Reducing bleaches.

The oxidizing bleaches *add* oxygen *to* the staining impurities;

The reducing bleaches *take* oxygen *from* the impurities.

On account of the different varieties of staining impurities, their bleaching may require different treatments. Some discolorations yield to oxidation, while others yield to a reducing action. Hence the two forms of oppositely behaving bleaching agents should be understood by the launderer. An attempt to combine the oxidizing and bleaching agents in a single preparation would result in the mutual destruction of all bleaching action.

What the Oxidizing Bleaches Are

The oxidizing bleaches are more extensively used, the common "chlorine bleach" being of that type. It is well to note that the oxidizing bleaches are very efficient sterilizing or germicidal agents, and their value in this respect is often underestimated. A classification of the oxidizing bleaches used in the textile and laundry industries would include:

1. Chlorine compounds—
   (a) Bleaching powder (so-called "chloride of lime).
   (b) Javelle water (so-called "soda bleach")
2. Peroxides—
   (a) Sodium peroxide.
   (b) Hydrogen peroxide.
3. Permanganates and perborates.

We have stated that these oxidizing bleaches yield oxygen to react upon the discoloring material. It is important that we understand there are two kinds of oxygen, or, to state it differently, that oxygen exists as a gas in two forms:

Ozone—Sunlight and electrical discharges (lightning) produce one form of oxygen known as ozone and having a formula O_3 Ordinarily ozone is present in air in very small quantities, but after a thunder shower its odor is frequently detected owing to its being dissolved in rain drops and brought to the earth's surface. This is the oxygen of our bleaches. It is highly reactive, forming hydrogen peroxide with water, and combining readily with anything which by virtue of its chemical nature can take up oxygen. Where such a chemical union occurs, the oxygen consumed loses its identity and becomes a part of the substance oxidized. In a broad sense oxidation is combustion. For instance, burning fuel is simple oxidation.

Atmospheric Oxygen—The chemical conduct of ozone is entirely different from that of the second form, the common oxygen (O_2) of the atmosphere. (The atmosphere contains 20 per cent, by volume, of oxygen.) Atmospheric oxygen is not very reactive chemically excepting under conditions of heat, or heat and pressure. In kier boiling of cotton and linen (especially pressure boiling), the activity of atmospheric oxygen is intensified to the point where serious damage to the goods may result, if the air is not expelled before the steam is turned on. In power laundry washwheels sufficient air is carried into the machine by the suds and the goods to give a slight bleaching effect at the higher temperature.

Why Ozone Is a Good Bleacher

The difference in the action of these two forms of oxygen, ozone and atmospheric, may be said to lie in their "molecular constitution."

As noted from the formulæ given, ozone is represented by the symbol "O_3"; ordinary or atmospheric oxygen is designated by "O_2". In the case of ozone, the molecule may be said to be supersaturated, and anxious to shake off one atom, which it readily does as soon as it comes in contact with something which is capable of combining with it or has an attraction for it.

Before these molecules of ozone and oxygen can act chemically (bleach), they must be broken up to form one or more single atoms. For instance, ozone will be broken up into $O_2 + O$. As ozone does this spontaneously, while atmospheric oxygen does so only under special conditions, their difference in behavior as bleaching agents is readily understood.

In other words, only atomic oxygen, or oxygen atoms, are of value in bleaching by oxidation. From this it follows that any substance which will cause the formation of atomic oxygen will act as an oxidizing bleach.

Readers will be reminded by this statement that the article on soap and the one on alkali described a similar breaking up process termed hydrolysis and ionization. Like an army advancing to attack a fortress, the strength is determined by the number of properly equipped fighting units. The mass of man power counts simply as reserve. An alkali depends upon the number of hydroxyl ions it can muster for its detergent efficiency. An oxidizing bleach depends upon the number of oxygen atoms it can muster for its bleaching efficiency. In either case the most satisfactory results are produced by the operator whose knowledge of these scientific principles enables him to provide conditions under which the chemical reactions are favored.

Many launderers who are under the impression that the chlorine of chlorine bleaches is directly responsible for the bleaching action will be surprised that oxygen is credited with it, and for that reason we shall attempt to explain what happens in a chlorine bleach.

The Chlorine Bleaching Action

The opinions of various investigators are somewhat at variance in regard to the exact mechanism of bleaching actions, but one thing is certain—the bleaching is done by *atomic oxygen* derived from the chlorine-containing liquor, one way or another.

A simple way to prove that the bleaching action is not done directly by the chlorine gas itself, is to introduce colored objects (flowers, fabrics, etc.) into a container filled with dry chlorine gas. It will be noted that no bleaching action takes place. If these articles are then moistened with water, bleaching action will promptly occur. All the bleaching properties of chlorine are parallel to the following reactions, which occur when chlorine is in contact with water:

Water + Chlorine = Hypochlorous Acid + Hydrochloric Acid.

Hypochlorous acid decomposes to hydrochloric acid and oxygen. We then finally have only hydrochloric acid and oxygen in the solution. In other words, chlorine decomposes water to form free oxygen with hydrochloric and hypochlorous acid. The *free oxygen* thus formed is then at liberty to combine with any substance which is capable of absorbing it. When these substances are whitened or rendered colorless by this absorption of oxygen (oxidation) we have a "bleaching action."

How Bleached Color May Be Restored

Let us remember at this point that our definition of an oxidizing bleach described it as one which added oxygen to the staining impurity. Three important considerations are worth mentioning in connection with this action:

First—The color only has been removed. The impurity is in the fabric as before.

Second—The color may often return due to the opposite chemical effect—taking the oxygen out. The sour may do it.

Third—The oxidation is destructive. While the color is being removed, some portion of the cloth fibers themselves are oxidized and weakened. Each subsequent bleaching intensifies this effect.

The Story of Bleaching Powder

Understanding the above general information on the manner in which cloth is whitened by bleach, the next step is a consideration of chemicals commonly used for the purpose. First come the oxidizing bleaches, of which the most prominent are those in the chlorine group. In an earlier paragraph it was stated that the important members of this group are: (a) Calcium hypochlorite; (b) Javelle water.

Calcium Hypochlorite—One of the oldest and perhaps most commonly known of the chlorine bleaches is calcium hypochlorite, known otherwise as "bleaching powder," "chloride of lime," "lime bleach," "lime chemic," etc. Its chemical formula is CaCl (OCl), and it is prepared by saturating slaked lime with chlorine gas, as:

Slaked Lime + Chlorine Gas = Bleaching Powder + Water.

The average content of available chlorine is 35 per cent.

Bleaching powder is a white powder having the odor of hypochlorous acid. It tends to cake when mixed with water, unless it is first made into a cream of slurry and poured into the water with stirring. A white residue of calcium hydroxide (slaked lime) settles out, and the clear liquor contains calcium chloride, calcium hypochlorite and other chlorate and hydroxide.

The calcium hypochlorite decomposes further (by partial hydrolysis) into slaked lime and hypochlorous acid. This latter compound is very unstable and readily decomposes into hydrochloric acid and free oxygen. To this free oxygen the bleaching action is due.

Calcium hypochlorite is also very rapidly decomposed by acids; even by the weak carbon dioxide (CO_2) of the atmosphere. In each case a lime compound and hypochlorous acid are formed, and in many cases hydrochloric acid is also formed.

Calcium Hypochlorite + Sulphuric Acid = Calcium Sulphate + Hydrochloric Acid plus Hypochlorous Acid.

These two acids may mutually decompose each other with a further liberation of chlorine.

It is clear from the above that the addition of acid to a bleaching powder solution will greatly speed up the action of the latter.

Where Bleaching Powder Is Used

Bleaching powder finds extensive use in the bleaching of paper pulp, textile materials, etc., but as any chlorine bleach is very destructive to silk or woolen fibers, its use on these materials is prohibitive. The cellulose fibers, cotton and linen, are less susceptible to damage, and, under proper conditions, very satisfactory results are obtained.

Unfortunately, there are but few cotton dyes which will withstand the action of chlorine bleach. Either the chlorine combines with the dyestuffs directly to form colorless compounds, or they are whitened (bleached out) by oxidation. About the only colors which will stand the action of a chlorine bleach are the vat dyes, and Aniline Black.

In the textile industry, the clear bleaching powder solution of an average strength of about three grams per liter (1 deg. Tw.) is used at room temperature. The strength will vary under different conditions of exposure and the nature of the material being bleached.

As the activity of all chlorine bleaches is greatly increased at higher temperatures, this is an important factor also.

(*To be continued*)

Emulsions in the Textile Industry

By Dr. Kurt Lindner

(*Textilberichte*, 1923, *pages* 581-2)

Translated by Ismar Ginsberg, B. Sc., Chem. Eng.

(*Concluded from April 7 issue*)

At the conclusion of the first part of this article it was stated that the most important consideration in an active emulsion is the fineness of the particles, whose necessary adjuncts are a large number of particles and a large internal surface area in the emulsion.

It is well to consider an example from practical operation.* An example is given of the use of an emulsion, which is known under the name of perpentol, which is a 90 per cent tetralin emulsion made with the aid of soap. This emulsion is employed with cotton goods. About 2.5 kilograms of the tetralin emulsion are employed in the treatment of one thousand kilograms of goods. The characteristics of this emulsion were found to be as follows:

Average diameter of particles—1.0×10^{-8} millimeters.
Number of particles in the emulsion—$150{,}000 \times 10^{9}$.

Then in 80 cubic centimeters of the emulsion which contains approximately 78.1 grams of tetralin there will be present 4.5×10^{15} or 4,500 billion particles which will possess a total internal surface area of 13,800 square meters. In one cubic centimeter of the bath, on the assumption that the particles are uniformly distributed, there will be present about 1.6 billion particles which would possess a total internal surface area of 46 square centimeters in spite of the fact that there will be only 0.75 cubic centimeter of tetralin present in the one cubic centimeter of liquid.

The chances of the particles of fat solvents coming into intimate contact with the impurities present in the textile goods are therefore very good. The figures given above represent approximations only, as in the actual washing process many special conditions may arise which cause the formation of large masses of matter in spots, saturation of the goods, partial disturbance of the protective action of the soap, all of which have a deleterious effect on the actual efficiency of the emulsion itself.

*Although this deals with emulsions which are not commonly used in this country—that is, the emulsions that are made with the aid of the fat solvent which is known as tetraline—nevertheless the principles remain the same and can be applied to any and all emulsions that are used in the textile industry. The conclusions that are reached in the case of the tetraline emulsions may, accordingly, be applied to the other emulsions in which more common fat solvents are employed. Furthermore, important information is derived from the behavior of the tetraline emulsions which have incited a certain amount of interest in this country.—Trans.

Conclusion†

The question is, what solvent is best suited for the purposes of the textile industry in preparing emulsions, all things being considered. Decalin, as well as turpentine, benzol and other hydrocarbons of the benzol series, halogenated hydrocarbons, etc., can be converted into the water-soluble condition in the same manner as tetralin. In actual practice it has been found that trichlor ethylene and carbon tetrachloride, in particular, have been used in the preparation of emulsions containing 90 per cent and more of the fat solvent. These emulsions have found use in the wool industry. They are employed in the raw wool washing operation because of their strong solvent properties and ability to dissolve wool fat, cholesterin, and they are also employed in washing woolen yarns for the removal of mineral oil, spinning preparations and the like that contaminate the yarn. The low boiling points do not constitute a disadvantage in this caes, as these temperatures are always greater than those employed in the wool washing operation. On the other hand, the volatility of the solvent renders the drying of the fabric comparatively easy, as the goods lose all their odor within a few hours.

†At the conclusion of the original article there is a note which discusses the question of the best fat solvent to use in making emulsions which are intended for use in the textile industry. The conclusions reached are given for what they are worth in abridged form.—Trans.

SYNTHETIC ORGANIC TO CO-OPERATE WITH BUREAU OF STANDARDS

At the meeting of the Dye and Intermediate Section of the Synthetic Organic Chemical Manufacturers' Association, held at Hotel Commodore, April 11th, a letter from George K. Burgess, Director of the Bureau of Standards, Department of Commerce, was read inviting the Association to appoint a representative to co-operate with the Bureau of Standards on matters pertaining to the standardization of dyestuffs—a broad term including standard types, nomenclature, fastness tests, etc., as well as research work helpful to both consumers and manufacturers of dyestuffs.

The Association accepted this proposal heartily and appointed Harrison F. Wilmot, technical adviser to the Association, to represent the Association before the Bureau of Standards.

Steps had previously been taken by the Bureau of Standards to secure the co-operation of the American Association of Textile Chemists and Colorists along similar lines.

Proceedings of the American Association of Textile Chemists and Colorists

The American Association of Textile Chemists and Colorists

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Lowell Textile School, Lowell, Mass.

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A. K. Johnson, Secretary, Lowell Textile School, Lowell, Mass.

Rhode Island Section—
Ralph F. Culver, Chairman, Box 269, Providence, R. I.
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New York Section—
Elvin H. Killheffer, Chairman, Newport Chemical Works, Passaic, N. J.
Herbert Grandage, Secretary, 121 Willard Avenue, Bloomfield, N. J.

Philadelphia Section—
Charles S. Hollander, Chairman, Rohm & Haas Company, Philadelphia, Pa.
Percival Theel, Secretary, Philadelphia Textile School, Philadelphia, Pa

FEBRUARY MEETING, PHILADELPHIA SECTION

The regular February meeting of the Philadelphia Section of the American Association of Textile Chemists and Colorists was held Friday, February 15, 1924, in Philadelphia. At 6.45 p. m. ten members sat down to dinner at the City Club of Philadelphia. The meeting was called to order by Chairman Dr. Charles S. Hollander at 8.15 p. m.

The minutes of the previous meeting were read and approved as read.

Dr. Hollander then announced the Program and Membership Committees.

Program Committee—Messrs. Bertolet, Goldthwait, Medde and Wade.

Membership Committee—Messrs. William J. Wall, B. K. Archer, J. C. Hamlen and A. B. Thompson.

A letter was read from Secretary W. E. Hadley stating that the invitation of the Philadelphia Section for the Association to hold the next annual meeting in Philadelphia had been presented to the Council and that action on the same had been held over until a latter meeting of the Council.

A report that the badges of the Society could be secured from Secretary Hadley was read.

Dr. Hollander then introduced the speaker of the evening, Walter J. Levering, who gave a most interesting and instructive address on "Wool Scouring and Carbonizing." (Abstract of this address is published herewith.)

On motion of Mr. Bertolet a rising vote of thanks was tendered the speaker.

The meeting adjourned at 10.15 p. m.

There were about fifty present.

PERCIVAL THEEL, Secretary.

WOOL SCOURING AND CARBONIZING*

By J. WALTER LEVERING,
Treasurer and General Manager, Eavenson & Levering Company, Camden, N. J.

(Abstract by Charles E. Mullin)

The widely diversified uses of wool and woolen materials, as well as the variations in climatic conditions in sheep-producing countries, necessitates the propagation of about forty more or less distinct breeds of sheep and some 200 crossbreeds. The wool from each of these breeds or crossbreeds differs in various ways from that of the other breeds. From a knowledge of the various qualities of these wools the manufacturer selects the stock best suited for his particular use.

Wools differ not only with the breed of the sheep and locality producing it, but also with the age and condition of the animal producing it, and with the manner in which it is removed from the pelt, etc. The wool may be either clipped or pulled, and if pulled will have minor differences according to the method of pulling, i. e., sweating, depilatory or lime pulling. Even the same breed of wool, pulled by the same process in different pulleries, may differ considerably due to minor variations in the process and skill of the operator.

*Abstract of an address delivered before the Philadelphia Section of the American Association of Textile Chemists and Colorists, February 15, 1924.

All of these variations and conditions must be borne in mind when scouring the stock and in the preliminary operations for scouring. Certain stocks may require opening by a willow or picker, while other stocks may require burr pickering, etc. For certain uses the fleeces may be sorted into any required number of sorts before opening. The various sorts may be scoured as different lots and used for different purposes.

Before attempting to scour the stock the scouring agents should be considered. The water should certainly be as soft as possible to prevent loss of soap and the deposition of lime and magnesium soaps upon the scoured stock. These soaps are insoluble, and not only give the stock a poor appearance and "feel," but may be highly detrimental in later processes.

Various soaps and alkalies are used in scouring, although a very large quantity of wool for certain purposes is scoured by means of water alone, the stock itself containing sufficient alkali, mainly potash salts, to complete the scouring necessary. Olive oil soap is perhaps the best soap for scouring, but cottonseed, corn, palm and red oil soaps are widely used. Sodium carbonate is the most widely used alkali.

When the wool fiber is placed in water of the proper temperature the serrations composing the fiber surface open more or less and allow the detergents to act upon grease and dirt held by them. Too high a temperature in the scouring bath permanently injures the stock even in the absence of added detergents, and this deleterious action is much aggravated by the presence of alkalies. For this reason temperatures above 130 deg. Fahr. are dangerous.

The fatty matter contained in wool, the so-called "wool grease," consists of various practically unsaponifiable but readily emulsifiable waxes with a small percentage of soaps and free fatty acids. This grease usually melts readily below 90 deg. Fahr., and in the presence of soap and especially alkali is at once held in an emulsified condition by the scouring liquor. The potash salts and soaps naturally present in the wool also aid materially in cleansing the stock. The grease is sometimes recovered by means of acid cracking the scouring liquor or by centrifuging. In the solvent scouring process, the stock is treated with a solvent such as naphtha, while on an endless belt conveyor the grease is always recovered. It might also be mentioned that there appeared a dry scouring process a few years ago wherein the raw stock was treated with powdered gypsum and afterward dusted, etc., to remove the powder. This process was highly unsuccessful and unsatisfactory.

When the stock is scoured by means of water alone, without the addition of soap or alkalies, it is often done in what is known as the rinse box. When detergents are used, the regular three, four or five bowl scouring machines are generally used. These machines of the older type are equipped with forks, but the newer machines have parallel rakes to push the stock along through the scouring liquor and through the squeeze rolls. These rolls are generally in sets of two, one above the other at the end of each bowl, the lower one of steel, and the upper one covered with either rubber, lapping or cloth. After leaving the last set of squeeze rolls the stock usually contains 30 to 40 per cent of water and passes into the drier.

These driers are usually equipped with one or three endless wire aprons, steam coils and suitable air circulating apparatus, so as to dry the stock to the desired moisture before packing.

In passing the wool through the scouring process it loses a very great deal in weight, depending upon the kind of wool, condition, previous operations, location and conditions under which it was grown, etc. Some wools may shrink as much as 75 per cent in scouring. In drying the stock it is never dried until completely free from moisture, but in this country about 13 per cent condition is allowed to remain in the stock.

In carbonizing, previous to the stock entering the solution of the carbonizing agent, the operations are identical with those of scouring, except that the stock should be very thoroughly cleansed.

Usually the stock passes directly from the last scouring bowl directly into the tank containing the carbonizing agent, which is generally either about a 2 to 5 per cent sulphuric acid solution, or a stronger solution of aluminum chloride. After remaining in this solution until all the vegetable matter has been thoroughly saturated, it passes through another set of all-rubber squeeze rolls into a carbonizer operated at about 240 to 260 deg. Fahr., where the vegetable matter is converted into the black and charred looking hydrocellulose which is readily removed from the stock by passing it through a series of crush rolls and dusters. Sulphuric acid carbonized stock is sometimes but not always neutralized in a dilute soda ash solution after dusting.

MARCH MEETING OF NEW YORK SECTION

The New York Section of the American Association of Textile Chemists and Colorists convened at eight o'clock Friday evening, March 28, 1924, in the Midtown Restaurant, 56 East Forty-first Street, Dr. E. H. Killheffer presiding.

. . . After transacting the routine business of the Section, Chairman Killheffer appointed the following Nominating Committee to select candidates for officers of the Section for the 1924-25 season: P. J. Wood, Dr. Oscar Flynn, Dr. F. X. Harold, D. P. Knowland and J. F. Warner.

Chairman Killheffer—We are favored again this eve-

ning by being able to continue something started at our last meeting which is exceedingly interesting to all of us, and that is the general subject of artificial silks. This evening we have with us Mr. Platt of the American Cellulose & Chemical Company, who is going to speak to us on the subject of Celanese. Mr. Platt! (Applause.)

THE DYEING OF CELANESE

By Herbert Platt

I am sure, gentlemen, it is a great pleasure to speak to you to-night. I must say that it is really quite a surprise, as early this week I knew nothing whatsoever about it. So what I have prepared is rather rough, as I did not have much time to get it together, and if it seems disjointed, you will have to excuse me.

Before I say anything about the dyeing of Celanese, perhaps if I tell you a little bit about Celanese itself, it will be interesting.

Celanese is a cellulose acetate silk and is manufactured in England by the British Celanese Company. It is a great success over there, and will very soon be made over here in this country.

Celanese enables manufacturers to produce woven and knitted fabrics of surprising quality and beauty, far surpassing anything on the market to-day in feel, washing fastness and fastness to light.

This (indicating) is a piece of knitted fabric of Celanese, and this other little piece is a piece of silk. That is real silk; this is Celanese. I would like you to compare the feel of those two pieces.

Celanese is a perfect insulator, and fabrics or garments made from it keep one cool in summer and warm in winter. On repeated washing, Celanese does not lose its sheen or feel, and in the white it doesn't turn yellow while being worn or washed. For underwear and lingerie, Celanese is remarkable for comfort, wearing and washing processes, and it has been proved that it is superior to natural silk and other fabrics in this respect.

Celanese will stand immersion in sea water for months, and, what is very important, it will endure the sun of tropical climates without deterioration. This proves its great stability.

Celanese excels through absolute regularity as to strength, elasticity, elongation, and especially as to regularity of denier, which is most important for the production of regular and even fabrics. Ribbons, woven and knitted fabrics made from Celanese have an unusually silky feel and they drape well.

Celanese is used extensively in combination with other fibers to produce mixed woven fabrics, mixed knitted fabrics, mixed hosiery, mixed yarns or cords. With cotton or other art silks fabrics are made up in the gray or the white and then can be dyed any two colors that may be desirable.

Now let us pass to the treatment of Celanese in the dyehouse, first of all the

Pre-treatment for Celanese Alone.—The best pre-treatment is just a simple scour in soap solution, to which has been added a small amount of ammonia. As an example:

One gram to 1.5 grams per liter olive oil soap,

One c.c. per liter ammonia 20 per cent.,

Soft water at 80 deg. Cent., for one-half to three-quarter hour.

Then give good rinsings in warm and cold soft water.

Where you have a knitted fabric, which contains a certain amount of oil, as most knitted fabrics do, it is an advantage to add to the scour bath up to 1 gram per liter soda ash and 1 to 3 cc. per liter of a hydrocarbon, Turkey Red oil emulsion, such as tetralene or oil-bane or something similar. I am not familiar with the names of those articles over on this side as yet.

Where You Have Mixed Goods Containing Celanese and Cotton or Celanese and Some Cellulose Artificial Silk.—For delicate shades where you are required to bleach the cotton, you must omit the usual alkali boil before dyeing, otherwise you destroy the valuable property of the Celanese for cross-dyeing.

The strong alkali would saponify the cellulose acetate and take back part of the acetate to the original cellulose, and that would have an affinity to direct cotton colors. But it will generally be found sufficient to give an open scour at a temperature of 80 deg. Cent., and by using about 2½ grams per liter of olive oil soap, 2½ c.c. per liter Turkey oil, 1 c.c. per liter ammonia at 80 deg. Cent. for three-quarters of an hour to an hour, you will find that this treatment is sufficient to prepare the mixed fabric for the action of the neutralized bleach liquor.

For bleaching it is best to use 0.25 deg. Tw. bath sodium hypochlorite. The material is treated in the cold for about one hour, according to the whiteness required on the cotton or other artificial silk.

You may in the bleach bath neutralize with acetic acid, actually in the bleach bath that will not affect the Celanese at all, or you may go into a separate sour bath after bleaching, then give the usual wash-off and the usual sour in a bisulphite bath, then a wash-off to remove the bisulphite.

As to the actual dyestuffs to be used for dyeing Celanese: For dyeing cellulose acetate we have had in the last four years a very varied number of dyestuffs, and dyestuffs of practically every class, and anybody coming fresh in to the dyeing of Celanese would really be in a maze and wouldn't know which dyestuffs to use.

In the last twelve months there has been a great deal of research on the problem of making dyestuffs to dye Celanese. Just as you make dyestuffs to dye wool, dyestuffs to dye cotton, especially for those fibers, so British

Celanese have set about to find dyestuffs which will dye Celanese and which are dyestuffs for Celanese.

These dyestuffs we call the Celanese S. R. A. dyestuffs. They are a new series of colors and they have the advantage that they leave cotton or other so-called artificial silks white. The Celanese S. R. A. colors constitute an entirely new departure in the art of dyeing Celanese, and they supersede all the older methods. They are being selected under rigorous scientific supervision to give the fastest and most reliable shades. You can use them in any combination to give colors or mode shades, and they are the simplest and most satisfactory method of dyeing Celanese that has yet been devised.

I might just review the range of colors which are now available; they have been selected from thousands that have been made. We have:

Celanese S. R. A. Pure Yellow I (a lemon shade).
Celanese S. R. A. Golden Yellow VIII (a daffodil shade).
Celanese S. R. A. Golden Orange I (a marigold shade).
Celanese S. R. A. Orange I (a tangerine shade).
Celanese S. R. A. Red I (a scarlet-red shade).
Celanese S. R. A. Red III (a crimson-red shade).
Celanese S. R. A. Red V (a violet-red shade).
Celanese S. R. A. Blue I (a reddish-blue shade).
Celanese S. R. A. Blue II (a reddish-blue shade).
Celanese S. R. A. Blue II (a blue shade).
Celanese S. R. A. Blue IV (a greener blue shade).
Celanese S. R. A. Blue V (a bright royal blue shade).

Various shades of nigger, navy and black are obtained by development; that is, the very deep navies and the very deep niggers are developed. These are obtained by using Celanese S. R. A. Diazo Solamine I, Celanese S. R. A. Diazo Solamine II and Celanese S. R. A. Diazo Solamine III.

The Solamine III is used for blacks. We call them "Diazo" because they are diazotized and developed to give the correct shade; we call them "Solamine" because they are yellow before they are developed.

There are a few other dyestuffs which you can use to augment this range, a few basic or gallocyanine colors, and these are employed for topping or giving especially brilliant effects, such as Peacock Blues, for lifting or topping the other colors.

Although they are not considered indispensable, the following colors will probably be found useful: Capri Blue GON, of Leonhardt; magenta crystals, the various makers; and Prune Pure, of Sandoz or British Dyestuffs Corporation; or Violet PDH, of Durand & Hugenin.

These colors are inferior to the S. R. A. colors in leaving the undyed cotton or so-called artificial silk white and in their fastness to cotton cross-dyeing, and their use must be restricted to the purposes I have just mentioned.

In dyeing the S. R. A. colors you require as assistants just olive-oil soap and Turkey-red oil. In the case of heavier shades we use a little salt, but that is very rare. For the basic colors, acetic acid and common salt. And that comprises the whole range of assistants used in the dyeing. For the developed shades we use, in addition, glue, formic acid and the developer.

Let us go along to the dyeing proper of the S. R. A. colors. The colors are put out as 10 per cent paste and they are dissolved in boiling soap solution. They dye Celanese direct from a mildly alkaline soap bath yielding the shades I have given. They may be mixed indiscriminately together for the production of compound shades. That is a thing which hitherto has not been done on Celanese. The difficulty has been to obtain a simple method to give mode shades.

In the basic range of dyestuffs there has always been a deficiency of reasonably fast yellow. In the acid range of dyestuffs there has been a deficiency of the reds and blues. So that you have been able to get certain effects with basic dyestuffs and certain effects with acid dyestuffs, but you couldn't mix the acid dyestuffs and the basic dyestuffs in one bath. When you came to getting a mixed mode shade, it invariably came down to a method of topping and bottoming; and that, of course, made the process very complicated, especially as in a great many cases if the dyer wasn't very familiar with the colors he would get combinations of a basic color with an acid color and in many cases would get a fugitive compound.

Later I will give a few typical recipes for various shades. The general methods of S. R. A. dyeing are simple, being similar to the dyeing of cotton or other artificial silks in a direct manner.

For heavy or tightly twisted goods which are difficult to penetrate and which have to be dyed in pale shades, it is advisable with the S. R. A. colors to dye for an extended period in the cold, and add a little extra soap or a little extra Turkey-red oil.

It will be found that most of the Celanese S. R. A. colors have quite a good affinity in the cold, and many shades can be dyed absolutely in the cold without sacrificing any fastness. The level dyeing qualities are good, and where you are dyeing mixed mode shades with, we will say, a red and orange and a blue, or a red, yellow and blue, with cotton colors, naturally you must pay at

tention to affinity ratios and temperature. That you have to do in all dyeing. With these Celanese S. R. A. colors, you will find that temperature and time ratio are rather lower down the scale of the thermometer.

In dyeing deep shades, it is sometimes of advantage to use common salt or Glauber salt, but in excess they should be avoided; you are quite familiar with the effect of common salt on a soap bath.

In dyeing mixed goods of Celanese and cotton, or Celanese and other artificial silks, with these dyestuffs, you get the Celanese dyed and the cotton or other artificial silk white. Therefore, dyeing mixed goods resolves itself into the application of these colors in conjunction with direct cotton colors with the property of leaving Celanese unstained, so that the solid shades or contrasting bi-color effects may be readily obtained.

I propose to speak later about the cotton colors for leaving Celanese white.

There is now an ample range of these cotton colors for giving all shades that may be desired for this reciprocal dyeing effect, and the S. R. A. colors will give you any shade on the Celanese. Thus, complete ranges may be dyed, leaving the Celanese white, and dyeing the cotton, or dyeing the Celanese and leaving the cotton white. In fact, in one bath you can dye two colors so contrasting as blue and red on the respective fibers, and nothing more is needed after dyeing than a simple rinse or light soaping to maintain the unstained individuality of each shade.

If, however, the dyer does wish to dye one fiber first and then cross-dye the other fiber, as some dyers do, then it is advisable to dye the Celanese first, as the Celanese S. R. A. colors withstand cotton cross-dyeing much better than cotton colors withstand cross-dyeing on the Celanese.

As to the apparatus used in dyeing Celanese, it is just the ordinary apparatus. The piece goods are dyed on the winch or the jig, according to the nature of the goods, and in the hank Celanese is dyed either by hand or on the various machines in use, and the dyer will have very little trouble—no trouble at all—in adapting his already existing plant to the use of S. R. A. colors for dyeing Celanese.

In the dyeing of Celanese there are certain restrictions, and in all dyeing it is the restrictions or the points to watch which are really of value to the dyer; it isn't the good points that are only of value to the dyer. What he wants to know are the places for caution, and I am going to tell you the restrictions in dyeing Celanese.

The first restriction is as regards temperature. In scouring and dyeing, one must not exceed 85 deg. Cent The second restriction and the only other restriction is to avoid the use of strong alkalis, as this destroys a lot of the intrinsic qualities of the Celanese. Otherwise, there are no important points to emphasize in the restriction line. And bearing those two points in mind, there is nothing difficult in the application or dyeing of Celanese, except that you must pay due regard to Celanese as a fiber, just as you would pay due regard to cotton or wool. If you are dyeing cotton, you don't expect to dye it the same way as you dye wool. If you are dyeing wool, you don't expect to dye it the same way as you dye cotton. A lot of people think Celanese should dye like other artificial silks, but it has a lot of intrinsic properties over other silks, and it is fundamentally different, and therefore requires dyestuffs especially for it, dyestuffs made to dye Celanese.

In dyeing Celanese with S. R. A. colors, soft water is necessary for successful dyeing, as the dyeing is done from a soap bath.

As to dye vessels, you might use either wood or copper. Copper is preferred because it is more easily cleaned. The dye volume, the ratio of the liquor to goods, is generally 25 to 1 for hanks or skeins, and 30-35 to 1 for piece goods. Knitted goods, of course, take a little bit more liquor than the woven goods. The dye bath is set with an addition of 1 to 1½ grams per liter of olive oil soap, and where the amount of color in the bath is very small, such as in pale shades, a little Turkey-red oil is added to the dye bath, about 1 to 2 c.c. per liter.

In making up the color, it has been found advantageous to use a portion of the soap which you have to put into the dye bath for dissolving the color. Pour the hot soap onto the dyestuff, then dilute with hot water, boil up, and add to the dye bath. In practice, it has not been found necessary to sieve the dyestuffs, but if the dyer wishes to do that as a precaution, that is all to the good.

After dyeing, simply rinse off in hot water. At about 45 for ten minutes is sufficient for direct shades. For developed shades, a light soaping should be given at 45 for about ten minutes. This is to remove excess of the developer. I think I will show this point.

The self-shades of the S. R. A. dyestuffs (exhibiting). Those are all self-shades of the single dyestuffs, and they may be mixed together in any proportion, any number of them in the same bath. These patterns I have here are windings taken off bulk dyeings of yarn in the dyehouse, and they have the recipes along the side. In connection with this sheet here, I don't know of any other method by which in one bath you can get a range of shades like that on the Celanese. There are no other dyestuffs in existence with which in one bath you can get those shades of gray fawns, drabs, putty and light brown. I would suggest for dyeing:

Tangerine—4 per cent S. R. A. Orange I (10 per cent paste), 0.7 per cent S. R. A. Red I (10 per cent paste). Cold—60 deg. Cent. one hour.

Gold—7 per cent S. R. A. Golden Yellow VIII (10 per cent paste). Cold—70 deg. Cent. one hour.

Gray—2 per cent S. R. A. Blue III (10 per cent paste), 0.3 per cent S. R. A. Golden Yellow VIII (10 per cent paste), 0.15 per cent S. R. A. Orange I (10 per cent paste). Cold—75 deg Cent. one hour.

Putty—3 per cent S. R. A. Blue II (10 per cent paste), 0.2 per cent S. R. A. Orange I (10 per cent paste, 1.5 per cent S. R. A. Golden Yellow VIII (10 per cent paste). Cold—75 deg. Cent. one hour.

Brown—8 per cent S. R. A. Blue III (10 per cent paste), 8 per cent S. R. A. Orange I (10 per cent paste), 2 per cent S. R. A. Golden Yellow VIII (10 per cent paste). Cold—80 deg. Cent. one and three-quarter hours.

Royal—8 per cent S. R. A. Blue V (10 per cent paste). Cold—80 deg. Cent. one hour.

Dull Green—3 per cent S. R. A. Blue II (10 per cent paste), 8 per cent S. R. A. Pure Yellow I (10 per cent paste). Cold—70 deg. one hour.

For mode shades I would suggest a mixture of S. R. A. Blue 3, S. R. A. Golden Yellow 8 and S. R. A. Orange 1.

That is a range of mode shades dyed on fabric (passing exhibit around). The percentages are given for 10 per cent paste, and that is why some of them will appear rather high; but when you consider the 10 per cent paste the color value is excellent.

The only shade which you have to get developed is black, excluding, of course, very dark navies and niggers, but I will take the black as a typical developed color. Black is obtained with S. R. A. Diazo Solamine 3. You dye on the S. R. A. Diazo Solamine 3 in the usual way for dyeing Celanese S. R. A. colors, 2.5 per cent of the solid color or 25 per cent of the 10 per cent paste; dye in a soap bath containing 2 grams per liter of olive oil soap; dye cold for about ten minutes; 45 deg. Cent. for ten minutes, and then 65 deg. Cent. for three-quarters of an hour; take out and rinse in warm, then cold, water; diazotize in a bath containing 14 per cent of hydrochloric acid 28 deg. Tw. and 4 per cent sodium nitrite for half an hour cold. Take out of that bath, give a wash-off in water, and then make up your developing bath with beta-oxynaphthoic acid, which can be obtained from many of the color firms on this side. There are quite a number of them supplying it. The beta-oxynaphthoic acid is dissolved with quarter of its weight of caustic soda and added to the dye bath, to which has been added 5 per cent glue, on the weight of the Celanese. Then you add to that bath 5 per cent of formic acid. This throws out the beta-oxynaphthoic acid in a milky form in the developing bath. Then enter the silk cold for ten minutes and for a further ten minutes at 45 deg. Cent.

Up to 45 deg. Cent. very little development will have taken place. Then take your temperature up to 65 deg. Cent. and your development will be complete, after giving forty minutes at 65 deg. Cent.

That is something quite new—diazotizing and developing at the high temperatures. Usually one associates diazotization and development with ice, but in the case of Celanese you diazotize and you develop at 65 deg. Cent.; rather, you develop at 65 deg. Cent. and you diazotize cold. If you try to develop cold you will probably find you will get no development at all. If you try to develop from an alkaline bath you will find again you will get no development. But if you develop at 65 deg. Cent. from an acid bath of a beta-oxynaphthoic acid you will get rapid and complete development and you won't get any diazo-salt destroyed.

For dyeing the basic or gallocyanine colors just pretreat in the usual manner described. For dyeing purposes you can use hard water. The dye vessel can be wood or copper, although copper is preferred. In the case, however, of Prune Pure, of Sandoz or British Dyestuff Corporation, or of Violet PDH, of Durand & Hugenin, you will find this dyestuff cannot be worked successfully in a copper dye bath without the addition of ammonium sulphocyanide. The bath volume is as before, the ratio being 25 to 1 or 30-35 to 1. After dyeing, the material is simply given a straight rinse. In the case of heavy shades a soaping at 45 deg. Cent. is necessary in certain cases to stop the rubbing. The general method is to dye these colors with acetic acid or formic acid in common salt. The exhaustion is not so good, but the brilliancy of shade yielded is sometimes indispensable.

Only those colors which are reasonably fast to light have been mentioned. The fastness to acid is, of course, excellent. The resistance to alkali and soaping is not so good as the S. R. A. colors.

Topping S. R. A. colors with small quantities of basic colors, you can take it, is on a parallel with topping direct cotton colors with a small quantity of basic color for lifting it. The list available of basic colors to use for such a purpose is large and I don't propose to go into it, but the dyer can use them at his own discretion for the limited purpose, remembering most of them are fugitive.

In dyeing mixed goods with the basic colors the basic color will go onto the cotton or artificial silk, and then, under the influence of acid and higher temperature, will gradually transfer itself from the cotton or other artificial silk onto the Celanese. So that a

result which at first does not appear very good can be improved by increasing the acidity and giving a prolonged run at the maximum temperature.

Such staining as this, where it is necessary to remove that staining for bright two-color effects, can be removed by judicious soaping. But you must be very careful; otherwise you will find you will soap the basic color off the Celanese as well as off the cotton or other artificial silk. For solid shades, of course, it doesn't matter very much, as staining doesn't make much difference if you can cover it up.

But the essential difference between dyeing basic colors for two-color effects and dyeing S. R. A. colors for two-color effects is that in one case you have to use one bath, in the other case you have to use two baths, as you cannot mix basic colors and direct colors in one bath.

Also, it is a matter of importance as to which dyestuff you put on first, if you are going to use basic colors. You must dye your basic color first on your Celanese, then top up with your cotton. If you do it the other way, put your cotton color on first, then you will find, when you come to top up the Celanese, your direct cotton color will act as a mordant for the basic color and you will have great difficulty in getting the piece onto shade.

Here are just two recipes for basic colors—one is for Saxe and the other for Deep Royal:

Saxe—0.3 per cent Capri Blue GON, 0.006 per cent magenta crystals, 1 c.c. per liter acetic acid (100 per cent), 30 per cent common salt (at start). Entered at 45 to 80 deg. Cent.—one and one-quarter hours.

Deep Royal—1.5 per cent Prune Pure, 1 c.c. per liter acetic acid (100 per cent), 20 per cent common salt. Entered at 45 to 80 deg. Cent.—one and three-quarter hours.

Here (indicating) are a few basic colors dyed on Celanese yarn.

For mixed shades, where you wish to dye Celanese and cotton or Celanese and other artificial silk a solid shade, the best method of working is obtained by adding all the S. R. A. color at the start and then half of the cotton color; the remainder of the cotton color is added at a high temperature, and the salt is added at the high temperature in portion. I haven't any solid effects here with me, but the following is a recipe for a solid light brown:

Six per cent S. R. A. Blue III (10 per cent paste), 2 per cent S. R. A. Golden Yellow VIII (10 per cent paste), 2 per cent S. R. A. Orange I (10 per cent paste), 1.2 per cent Chlorazol Brown RD (B. D. C.), 0.15 per cent Chlorazol Brown RK (B. D. C.), 15 per cent common salt. Cold to 80 deg. Cent.—one and one-half hours.

For a Solid Scarlet—5 per cent S. R. A. Red I (10 per cent paste), 1.25 per cent C. R. Chlorazol Fast Scarlet 4BS (B. D. C.), 10 per cent common salt. Cold to 75 deg. Cent.—one and one-half hours.

I don't propose to burden you with all these recipes.

I have some patterns here, I believe, of bi-color effects. This one (indicating) is obtained by using S. R. A. Red 1 and a direct green in one bath, and, as you can see, both colors are quite nice and clear.

There are a flame and a gray—that is No. 1, gotten with S. R. A. Orange 1 and S. R. A. Pure Yellow and Fast Gray in the same bath. All of these are obtained by putting the S. R. A. color and the cotton color in the same bath, and if anybody wishes to know the recipes of them I will give them very gladly. I have them here for anybody who wishes to hear what they are.

There is just one bi-color effect, I believe, on that card where basic colors are used, and that is the case of the peacock and the gray. There Capri Blue is being used as a bottom, and it has been topped up in a fresh bath with a direct gray.

Hosiery can be dyed quite satisfactorily by this method. The method used is very similar to the one I have just mentioned. You simply add all your S. R. A. color at the start, half your cotton color, and then at the higher temperature add the remainder of the cotton color and salt in portions. The top temperature of dyeing, of course, as I mentioned, must be kept down to 90 deg. Cent. This has been found to be quite practical and is being used on a bulk scale.

Where you require a solid black on stockings, one dyes on the S. R. A. Diazo Solamine 3 first and dyes the black on the Celanese, and then tops up in a fresh bath with the direct black, or it is quite possible to dye the S. R. A. Diazo Solamine 3 on first, along with the developing direct cotton black, and develop the two dyestuffs together to a solid shade.

These (exhibiting) are more two-color effects. These two are perhaps interesting because in this case you have got the cotton dyed black and the Celanese left white. In this case it is the same fabric; you have the Celanese dyed black and the cotton left white. They are both opposite. The remainder are two-color effects and have been obtained in one bath, with the exception of this one with the bright green.

This is a pattern which is of interest because it has been used to a very large extent on the other side, as

this pepper-and-salt effect has been used quite a good deal for fancy hosiery and stockings.

That (demonstrating) is just a piece of circular knitted Celanese dyed almond green.

With regard to cotton colors used for dyeing cotton or other artificial silks, leaving Celanese white, not all cotton colors leave Celanese or acetate silk white. It is quite wrong to say that cotton colors leave artificial silk white; they leave it undyed. As a general statement, it is not correct. Selected cotton colors leave Celanese white or acetate silk, and that comprises probably 60 per cent of the cotton dyestuffs. But during the manufacture of cotton colors and all other colors there is used a certain amount of shading. Not all batches come out alike, and they have to add a little bit of yellow or red or blue to get the batch onto shade. They may have a perfectly Celanese-resisting direct cotton color, but they may use to shade that color a little bit of dyestuff which stains Celanese, and this is often the case. We found early one bath, we will say, of direct Diazo Blue BH would give a perfect resist; the next batch would be hopeless. It wasn't the fault of the dye Diazo Blue BH, which leaves a perfect white, but it was just the fault of some impurity —it may have been a shading dyestuff; it may have been impurity or excess of one of the intermediates; it may have been a case that one intermediate stained the Celanese and the other didn't, and in this particular instance where it stained so badly they got excess of the wrong intermediate.

However, the British Dyestuffs on the other side have produced a very good range of Celanese-resist colors.

At present arrangements are being made with American dyestuff manufacturers to make Celanese resist cotton dyestuffs. One range of dyestuffs is on the market this side, and I don't doubt for a minute that when Celanese is produced in America it will be of interest to American dye manufacturers to put out a Celanese-resist range.

Here are a few hanks of cotton Celanese dyed with Celanese-resist dyestuffs obtained in this country.

This is a stocking made from Celanese and cotton; just the cotton is dyed and the Celanese left white. There is a large quantity of this style of goods sold on the other side.

Besides the colors there which show a perfect resist, I wish to show you what I mean when I say that not all cotton colors leave cotton white. For instance, here you have a black of the E-Extra type. Here you have a number of cotton colors which stain Celanese, and that is what I mean when I say the colors must be selected and tested to leave Celanese white.

These (exhibiting) are some fancy yarns of cotton and Celanese which you might like to look at. I am letting you look at these things because it saves a lot of talking.

There is just one thing I haven't mentioned, and that is Celanese in conjunction with real silk. You must bear in mind that when you are dyeing Celanese in conjunction with real silk the limitation as to temperature is 85 to 90 deg. Cent., and it has been found that one can boil off successfully at 85 to 90 deg. Cent. For bleaching, where you have to bleach your silk, it has been found that the only thing necessary in the bleaching bath is to limit the temperature to 90 deg. Cent. and watch that your silicate doesn't give you too high alkalinity to saponify the Celanese.

The S. R. A. dyestuffs do not leave silk absolutely white. Most of them stain it slightly. Some of them stain it more than others, and for that purpose they have to be selected so that you use, as far as possible, those colors which leave the real silk as white as possible.

I don't think I have anything more to say on the subject, unless somebody cares to ask questions, which I will do my best to answer. (Applause.)

Chairman Killheffer—Undoubtedly, there are a great many questions that various members want to ask Mr. Platt. I began to be fearful as he went on there that if he talked long, Levinstein and the British Dyestuffs Corporation would have all the business and some of the rest of us would have a hard row to hoe. (Laughter.)

Mr. Platt—Arrangements are being made for American manufacturers to make these dyestuffs.

Chairman Killheffer—If you have some questions, fire away. I am sure Mr. Platt will be glad to answer you.

Dr. Oscar R. Flynn—Several of us would like to know whether these S. R. A. colors are a development of the Ionamines. We thought possibly they were.

Mr. Platt—No, the S. R. A. colors are not the Ionamines.

S. F. Carter—I would like to ask Mr. Platt if in the Celanese colors any trials have been made as to how they are applicable for printing?

Mr. Platt—Yes, they have been found very satisfactory for printing. You just take the paste, the 10 per cent paste color, and add your usual thickening agents and steam. With a little variation of the usual practice, they have been found to work very well.

P. J. Wood—I would like to point out that you warned the company very freely not to exceed a temperature of 85 to 90 deg. Cent., but in steaming it would seem to me you would exceed the temperature of 85 degrees.

Mr. Platt—That is only for a short period and steaming is not the same as putting in the boiling liquor.

Mr. Wood—But I remember some years ago making experiments with Lustron—

Mr. Platt—That is not the same thing.

Mr. Wood—It is also an acetate silk.

Mr. Platt—Yes, but I purposely avoided using the term as far as possible. I know very little about Lustron, but I can tell you it is not the same thing; it is quite different to Celanese.

There is one thing I might say about Celanese: You can give it an acid finish of 2 c.c.'s per liter of formic acid and it won't have any ill effects whatsoever. Celanese is perfectly stable to an acid finish or to the usual alkaline emulsion finish.

K. B. Blake—What about the Celatene colors of Scottish dyes—do you know anything about those?

Mr. Platt—They are comparatively in the research stage yet, and the only color on the market is Celatene Orange. I have seen Celatene Orange, and from what I have seen it is quite nice and fast and dyes quite satisfactorily. But as I understand, that is the only color on the market as yet—

Mr. Blake—And Cellutyle. I have seen several recipes containing Cellutyle colors.

Mr. Platt—They are a range of dyestuffs put out by the British Dyestuffs Corporation eighteen months ago, and I am afraid you have to be quite expert at dyeing Celanese to dye with those colors, as all the colors cannot all be mixed in one bath. I believe some of them are of an acid nature, and some of them are of a basic nature. The general fastness is not so good as the S. R. A. colors.

Mr. Wood—Can these S. R. A. colors be used for dyeing the grounds in Celanese goods, or mixed goods, and discharging with hydrosulphite?

Mr. Platt—No, you will not find that these colors discharge easily with hydrosulphite. You may find some will tend to discharge more easily than others, but that is a thing you would have to try. I have not seen that tried out. It is a thing that might be tried out, but I think you will find them quite resistant.

Mr. Sussman—In reference to the S. R. A. colors, you claim they are a distinct class. Is that correct?

Mr. Platt—That is quite correct.

Mr. Sussman—Do you happen to know if there is any special line of derivatives they are made from?

Mr. Platt—I can't tell you that, Mr. Sussman.

W. E. Mitchell—Have you made any experiments with vat colors?

Mr. Platt—I have seen around here a pattern card of Ciba colors on Celanese. I saw it a little while before the lecture; somebody had it, I don't know who. Oh, yes, this is it. (Referring to Ciba pattern card.) I remember I saw this pattern card some time ago over on the other side and I have just heard that you are a Ciba man. (Laughter.)

However, I will tell you briefly that the fastness of vat dyes to Celanese doesn't obey the fastness laws on cotton. You will find that vat colors which are fast on cotton are not very fast on Celanese. In fact, it is rather remarkable that the vat colors are not so fast to light as they might be on Celanese.

Vat dyestuffs, especially those of the Ciba type, are used for special types of work. The alkali used in dyeing is a factor which must be watched closely. There are two or three vat colors which are applied to Celanese, but you will find that the Celanese S. R. A. colors are to all intents and purposes as fast as most of the vat colors.

F. X. Lehmann—Fastness to what? Washing?

Mr. Platt—Washing, light and general wear.

Mr. Lehmann—You couldn't use Celanese and mix it with a wool fabric and dye the wool fabric cross-dyed, could you?

Mr. Platt—Yes, you could. I will just make an exception there of S. R. A. Blue 1 and S. R. A. Blue 2 which are being replaced. S. R. A. Blue 1 and S. R. A. Blue 2 will not stand wool cross-dyeing, but for the remainder of the Celanese S. R. A. colors, that is quite satisfactory.

Mr. Lehmann—How does Celanese fiber stand in a piece of cloth as a stripe, for instance, instead of a silk stripe? Will it stand very heavy fulling? You said that the heavy alkalis have to be eliminated. If the soap associates in the fulling mill, in its component bath, oil and alkali, is the Celanese fiber destroyed?

Mr. Platt—I don't say that the alkali destroys the Celanese—don't misconstrue that. You can saponify Celanese without destroying it up to a point. But you do destroy its property of remaining white when you cross-dye with cotton colors. You probably couldn't see the difference between a Celanese which was saponified, we will say 5 per cent, and one which was not saponified at all, but you would see the difference if you tried to cross-dye with cotton colors.

Mr. Lehmann—Cotton colors are usually dyed at a much lower temperature than wool colors.

Mr. Platt—I have a range here of wool colors that I purposely have not said anything about because I thought I had said enough about British dyes. I had kept them in my pocket and didn't intend to talk about them, but I will have to bring them out.

Here (exhibiting) is the full range of British dyes, acid colors, tested out for leaving Celanese white. There are good ones and bad ones among this range. As a matter of fact, it is the range that was tried out to select—

Mr. Lehmann—We know the different colors of the British dyes as compared with the American-made dyes.

Mr. Platt—Well, that is the British dyes range. Those were dyed at 75, but you could dye up to 85 if you wished.

Chairman Killheffer—Did I understand you to say that in wool cross-dyeing you should not exceed 85 degrees.

Mr. Platt—Yes.

Mr. Lehmann—Have you experimented with the alizarine colors on a chromium cloth mordant?

Mr. Platt—I don't know of an instance where anybody has been able to get a mordant on Celanese. We have tried but we have never been able to get a mordant on Celanese. We have never been able to get a mordant on Celanese successfully and get a satisfactory dyeing.

Chairman Killheffer—Are there any further questions or comments on this subject?

Mr. Blake—Will the S. R. A. colors dye Lustron, do you happen to know? Has it been tested to your knowledge?

Mr. Platt—These Celanese S. R. A. colors were produced after a lot of research and that research was done at the British Celanese, Ltd.

The Celanese S. R. A. dyestuffs and dyeing methods for Celanese are covered by patents, patent applications and secret processes, which are the property of the company. They have decided to allow dyers and their clients to use these processes, free of royalties and other charges until further notice, if used in conjunction with Celanese yarn—fabrics or articles—whether these are pure Celanese or Celanese mixed with silk, wool, cotton or other natural fibers or with the artificial silks in the market at the present time when they consist of cellulose. That is the position. I don't know how they dye Lustron.

Chairman Killheffer—If there are no other questions on this subject we will hear from the next gentleman on the program, Mr. Carter. (Applause.)

S. F. Carter—I believe I am to talk to you regarding the scrooping of silk dyed by the nitric acid process.

The scrooping of silk which is dyed by the nitric acid or mandarin process has offered some difficulty for this reason: that if you take the silk which has been passed through the nitric acid, washed, then soaped, so as to spring the orange shade, when you come to scroop that in an acid bath, the orange shade goes back again to the yellow.

So far as I know, the only method has been this: The silk coming out of the acid bath has been washed, so as to leave a small amount of nitric acid present in the silk, and then passed into the soap and washed. That is the only way scroop can be done. If you try to scroop in the ordinary way, after the orange shade has been developed, the original yellow which the silk is, as it comes from the nitric acid, will be reformed by the action of the scrooping, whether it be done with tartaric or acetic acid.

When I spoke of that old process—I think it was at our dinner—I described the way in which it was done a great number of years ago in France. I think the date of the particulars which first came into my possession was 1854. It may be perhaps of some interest to know that it has been modernized.

The old way, as I told you then, was to take the silk and block with the resist, which was composed of tallow and resin, pass through the acid, wash, soap and wash, the soap springing the yellow which was formed by the nitric acid into the gold orange and clearing the resist.

That process has been modified a good deal and made more practicable and productive in this way: When the resist was originally blocked on, it was dusted over with fullers' earth, or something like that, so that it could be hung up while it dried out and set. By the modern method, the resist that is printed on is composed of British gum, containing some oxide of zinc, about eight ounces to the gallon, which, of course, can be blocked and dried without trouble, and the goods, instead of going through a bath, where the silk remains a certain length of time during passage through the acid, are padded or foularded through the nitric acid at about 30 deg. Tw. They are run through the nip, the bottom roll furnishing the acid up to the nip. On leaving this, they pass over three or four perforated steam pipes. The steam pipes are wrapped around with felt so as to dry the steam, and after passing over the steam they then go straight into the washing. After the washing they are soaped, and as a result the white comes out clear.

It is rather interesting to know that some colored effects have been done by introducing certain basic or acid colors in that resist. And after printing the goods are steamed in order to fasten the colors into the silk, and then they are mandarined through the nips, passed over the steam pipes, washed and soaped. That is the modern way of doing it.

I don't know whether everybody here was present when I spoke about the nitric acid process, so I thought it might not be amiss if I just showed the original goods which are done simply orange and white, in order that those who didn't see them before would know what we were speaking about. Of course, with the present way of resisting, anybody acquainted with printing knows that it is a lot more practical and that we get what we all want, especially on this side—production.

There is another point I think I forgot to mention when I spoke previously about it: In the old days they used sometimes to modify the shade of the mandarin by adding some nitrate of iron to the acid; then, on soaping, there was a certain amount of buff formed and the shade of the mandarin orange was modified.

I think, Mr. Chairman, that is about all I have to say,

and that it covers the subject which has been inquired about. (Applause.)

Chairman Killheffer—We have several more questions which the Secretary will read.

. . . Secretary Grandage read several other questions which had been submitted, none of which were answered.

. . . Chairman Killheffer then made an announcement with reference to a testimonial dinner to be given to Francis P. Garvan, after which the meeting adjourned at 9.40.

APRIL MEETING, NEW YORK SECTION

The regular monthly meeting of the New York Section will be held on Friday, April 25th, at Stewart's Restaurant, 30 Park Place. Dr. B. Wuth, of the Ciba Company, will speak on "The Influence of Dispersion on Vat Dyeing." The members of the section are urged to be present as it is expected that an interesting discussion will follow Dr. Wuth's talk, which by itself will undoubtedly be of great interest.

NOTICE OF FINAL MEETING OF SEASON, RHODE ISLAND SECTION

The Rhode Island Section will hold its final meeting of the season at the Turk's Head Club on May 9th. The event will be made somewhat unusual in that it will be Ladies' Night; the informal dinner will be followed by various forms of entertainment of which a detailed announcement will be sent to members a week or so before the date.

CORRESPONDENCE

The following letters, which are self explanatory, are of interest to members of the A. A. T. C. C.:

Passaic, N. J., March 19, 1924.

Dr. James Rowland Angell, President,
Yale University, New Haven, Conn.

Dear Sir: The New York Section of the American Association of Textile Chemists and Colorists recently had the pleasure of listening to a very interesting lecture by a member of your faculty, Professor Harold Hibbert, on "Recent Developments in Cellulose Chemistry."

We are intensely interested in his labors on oxy and hydrated celluloses since they promise to yield results of fundamental importance to the entire textile industry. As a matter of fact, we believe the textile industry in a number of European countries is far ahead of the American textile industry in respect to new developments in this particular field, and it is, therefore, of very great importance that an institution like yours should point the way in this country.

As Chairman of the Section I am very happy to express to you the thanks of our Association not only for the address given us, but for the liberal attitude shown by you at Yale in providing facilities for this work. We are very hopeful that you may find it possible to expand it rapidly as it will undoubtedly help us to understand much better than we do at the present time some of the scientific principles underlying the great textile industry.

Yours very truly,
(Signed) ELVIN H. KILLHEFFER,
Chairman.

March 27, 1924.

Dr. E. H. Killheffer,
Newport Chemical Works, Inc., Passaic, N. J.

My Dear Dr. Killheffer: We appreciate very much your kind letter of March 19th regarding the lecture of Professor Hibbert. I am sure he will be gratified to know of your appreciation.

Yours very truly,
(Signed) JAMES R. ANGELL.

March 28, 1924.

Dr. E. H. Killheffer,
American Association of Textile Chemists and Colorists, Passaic, N. J.

My Dear Dr. Killheffer: President Angell has forwarded me a copy of your kind favor addressed to him under date of March 19th, in reference to my lecture in New York.

Needless to say I appreciate very highly the kind things you say about my work and the very sympathetic attitude shown by your Society and yourself toward it.

Thanking you heartily for your kindness in the matter,
Very truly yours,
(Signed) HAROLD HIBBERT.

TWENTY-SECOND COUNCIL MEETING

The twenty-second meeting of the Council, a complete report of which will be published in a future issue, was held Friday evening, March 28, 1924.

At this meeting the following applicants were admitted to Active and Junior membership:

Active Members

Borrmann, Dr. Bernhard, 4 Avenue J, Brooklyn, N. Y.

Broadbent, Elliot, 115 Wilson Avenue, Rumford, R. I.

Clarenbach, Daniel L., 159 Hamilton Avenue, Passaic, N. J.

Clayton, Howard D., 433 River Street, Troy, N. Y.

Cowan, Louis F., Calco Chemical Company, 35 Hartford Street, Boston, Mass.

Drobile, Albert William, 324 Pembroke Road, Cynwyd, Pa.

Hannant, Fred A., 10 Congress Place, Fitchburg, Mass.
Knight, Dr. George D., 167 North Grove Street, East Orange, N. J.
Muller, C. F., 44 Evergreen Street, Boston (20), Mass.
Pierce, A. H., 117 Hudson Street, New York City.
Seibert, C. A., 42 Twelfth Avenue, Paterson, N. J.
Seltenwirth, Louis L., 704 Eighth Avenue, Astoria, Long Island City, N. Y.
Sims, Clarence, 84 Pacific Street, Central Falls, R. I.
Summers, Dr. F. P., 152 West 108th Street, New York City.

Junior Members

Fitzgerald, Joseph P., 2220 E. Huntingdont Street, Philadelphia, Pa.
Graenicher, Otto F., 433 Ellison Street, Paterson, N. J.
Jangstetter, F. M., 29 Prescott Avenue, Clifton, N. J.
Luckman, Hugh C., 169 Annsbury Street, Philadelphia, Pa.
Nutting, C. L., P. O. Lock Box 262, Salem Depot, N. H.
Walsh, George, 2382 Eighth Avenue, New York City.

APPLICANTS FOR MEMBERSHIP

Active Membership

Adams, Carleton C., chemist, Rockland Finishing Company, Rockland County, N. Y. Sponsors: George A. Northup, Jr., and E. H. Aeckerle.

Eichlin, Arthur S., textile chemist, Bureau of Standards, Washington, D. C. Sponsors: William D. Appel and F. R. McGowan.

Goldman, Moses H., dyer, Artistic Dyeing Company, Brooklyn, N. Y. Sponsors: Joseph S. Lange and P. Davagne.

Hubbard, C. C., Industrial Fellow, National Association Dyers and Cleaners, United States and Canada, Bureau of Standards, Washington, D. C. Sponsors: F. R. McGowan and William D. Appel.

Luck, George F., superintendent Louden Hosiery Mills, Louden, Tenn. Sponsors: E. H. Hinckley and P. F. O'Neill.

Mackenzie, Kenneth, instructor chemistry and dyeing, North Carolina State College of Agriculture and Engineering, Raleigh, N. C. Sponsors: E. H. Hinckley and P. F. O'Neill.

Robertson, John C., boss dyer, K. M. Gilmore Company, Somerville, Mass. Sponsors: R. F. Culver and H. L. Schwarz.

Rosenberg, Isidor, boss dyer, Artistic Dyeing Company, Brooklyn, N. Y. Sponsors: P. Davagne and W. E. Mitchell.

Schenke, Edward M., Research Fellow, National Association of Hosiery & Underwear Manufacturers, Bureau of Standards, Washington, D. C. Sponsors: William D. Appel and F. R. McGowan.

Zisman, Louis S., boss dyer, Gotham Silk Hosiery Company, New York City, N. Y. Sponsors: Joseph S. Lange and P. Davagne.

Junior Membership

Cameron, N. J., student, Bradford Durfee Textile School. Sponsors: J. Worton and A. E. Hirst.

Davis, M. L., laboratory assistant, Pacific Print Works, South Lawrence, Mass. Sponsors: G. A. Moran and William H. Cady.

CHANGES OF ADDRESS

Adams, Edwin W., 24 Vernon Street, Auburn, Maine.
Christus, Photis J., 338 Suffolk Street, Lowell, Mass.
Franke, K. W., P. O. Box No. 148, University, Va.
Hall, William C., 371 Kerringan Avenue, West Hoboken, N. J.
Jones, Roy L., 526 North Winsor Street, Bound Brook, N. J.
Lind, Edward D., 1717 Forty-sixth Street, Brooklyn, N. Y.
Mowry, S. J., Southbridge, Mass., care of Southbridge Printing Company.

ASSOCIATION BADGES

Those who attended the Annual Meeting of Providence had an opportunity to examine and purchase the new lapel button badges which were there distributed by the Secretary.

For the benefit of members who were unable to attend the meeting an illustration of the badge is shown herewith.

The three "rings" are enameled in red, yellow and blue, respectively, and the initials and border are brought out in gold. The general effect is exceedingly attractive.

Badges may be secured at $1.50 each by addressing the Secretary.

WALTER E. HADLEY,
5 Mountain Avenue,
Maplewood, N. J.

AMERICAN
DYESTUFF REPORTER

Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto.

LOUIS A. OLNEY
PROFESSOR OF CHEMISTRY AND DYEING, LOWELL TEXTILE SCHOOL
Directing Editor

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REMOVAL NOTICE

BY the time this issue of The REPORTER is in our reader's hands our publication offices, which have for five years past occupied premises on the forty-first floor of the Woolworth Building, will have been removed to much more commodious though less exalted quarters at 90 William Street, New York City. We trust that our readers will make note of the change of address, and at the same time beg to extend a most cordial invitation to all to visit us at our new abode.

SIR WILLIAM ALEXANDER'S RESIGNATION

RECENT news dispatches from England advise of the resignation of Sir William Alexander as chairman and managing director of British Dyestuffs Corporation, following the corporation's annual meeting. No intimation as to a possible successor is given nor is any reason for Sir William's resignation assigned. It is understood, however, that he will continue in office until such time as a successor may be chosen.

This action on the part of Sir William came as a distinct surprise to those in America who have followed the affairs of the British Dyestuffs Corporation and, in so far as news reports indicate, is equally surprising to the British. It is possible that the general dissatisfaction voiced by the British public in regard to the projected covenant between British Dyestuffs Corporation and the Interessen Gemeinschaft, which project was actively sponsored by Sir William, may have been the chief activating motive.

However this may be, it is at least interesting to the American dyestuff manufacturing fraternity to learn that one more non-technical executive has seen fit to surrender the direction of a large dyestuff manufacturing enterprise. If Sir William's resignation leads to the appointment of a successor who is experienced in the technique of dyestuff manufacture and application, and who can bring to his duties a wealth of practical knowledge and a thorough understanding of dyestuff traditions, gained through intimate association with all phases of dyestuff manufacture and application, it is our opinion that the British dyestuff industry as a whole, and the British Dyestuffs Corporation in particular, will benefit materially thereby.

During recent years The REPORTER has repeatedly pointed out in its editorial columns the hopelessness of expecting an executive unfamiliar with the technique of dyestuff manufacture and application to succeed as the directing head of a large dyestuff manufacturing enterprise, no matter how excellently equipped he may be in regard to general mercantile and industrial ability.

Because of the extremely technical nature of the dyestuff manufacturing industry, and because of the absolute necessity of a large background of practical experience in this field upon which to base executive decisions, it is next to impossible for one lacking long and close association with the industry to avoid grave errors in judgment. It is, of course, perfectly true that a majority of the individuals who succeed as technicians lack the necessary business ability to qualify them as efficient executives. Nevertheless, this happy combination is occasionally obtainable and it is worthy to note that, with practically no exceptions, the German companies, whose leadership in both the manufacturing and marketing of dyes has not as yet been seriously questioned, have developed and maintained their supremacy in this field under the leadership of executives who were also technicians of high ability.

Whether or not Britain has an individual or individuals who combine both technical and executive qualifications we cannot say. We believe, however, that it is much simpler for a well trained technician to develop executive ability than it is for a born executive to acquire the necessary insight into technical matters. In the persons of Dr. Herbert Levinstein and Sir Joseph Turner the British have two individuals well trained in the technique of dyestuff manufacture, under whose leadership the component parts of British Dyestuffs Corporation were successfully developed. These gentlemen, it appears, were unable to harmonize their views subsequent to the formation of British Dyestuffs Corporation, and both withdrew from active participation in the affairs of the company. Whether either one of them could be induced to assume direction of the affairs of British Dyestuffs Corporation, or, if they could, whether they possess the necessary business ability, we cannot say.

We feel sure, however, that either of these gentlemen, or any other similarly situated, who through his own efforts had assisted in the development of the British dyestuff manufacturing industry, and who, because of the very nature of this accomplishment, must

realize the futility of expecting any close association with the Interessen Gemeinschaft to result in anything but complete absorption by the German interests, would, from the standpoint of the welfare of Britain as a whole, prove far more satisfactory as an executive for the British Dyestuffs Corporation than one who, apparently, was concerned chiefly with the production of dividends regardless of the ultimate fate of the enterprise from a national standpoint.

Whoever may be Sir William Alexander's successor, it is our earnest hope that he will be a man whose breadth of vision will recognize as the first essential to the preservation of the British dyestuff manufacturing industry a complete independence from German entanglements.

TECHNICAL CONTROL OF CHEMICAL PROCESSES

IN the April 7th issue of The Reporter there appeared an article, entitled "Chemistry—An Aid to the Knitter," which pointed out various ways in which an efficient textile chemist could be of assistance to the manufacturer of knit goods. Having had our interest in this subject aroused by this article, we were at particular pains to discuss this subject with dyers and other practical men with whom we came in contact at the recent Knitting Arts Exhibition in Philadelphia.

Judging from our conversations with a great number of these men who stopped at our booth during the course of the week, we believe that this branch of the textile industry stands more gravely in need of expert technical advice than any other. It was truly surprising to discover, upon inquiry, how very large a percentage of the chemical operations in the various mills are handled purely by "rule of thumb" methods. Although most of the individuals with whom we talked were well versed in the "how" of the various dyeing, bleaching and finishing operations under their control, relatively few of them seemed to have knowledge of the "why" of these operations. While it is quite possible for purely empirical knowledge to direct operations which produce eminently satisfactory results, it is unquestionably a fact, substantiated by the experience of countless textile manufacturers, that intelligent technical control applied in conjunction with practical experience produces far more satisfactory results and accomplishes, in many instances, material money savings.

We earnestly recommend the article mentioned above to the attention of all knit goods manufacturers, believing that in it they will find suggestions which, if put into operation, will materially improve the quality and economy of their output.

T. C.'S COLUMN

DYE MAKERS' POLICIES

If we could all play ball as well as we know how, we would long since have been in some big league. Fate, however, has sent most of us to help tell the management how to run a mill, or to partake in some other equally important textile task.

I imagine that I am very much like the boys that know so much about playing ball. I understand the dye game perfectly, but somehow the scouts have not yet gotten me into the selling end.

At any rate, there is one point that has always been a mystery. Why is it that whenever one writes a dye firm for a sample and quotation, he gets the sample all right but has to write again for the quotation? There are exceptions, but it looks like one of those habits that everyone continues but no one stops to analyze. Whatever the reason, I do not like to write two letters when one will answer the purpose, and at times when I have wanted to make money values or similar comparative tests the two or more days so often necessary to get the price has eliminated the dye in question. Even though dealing with a one-price house, one cannot help feeling vaguely that the seller is hoping to make the price proportional to the amount of interest that is shown in his color. There are exceptions to all rules, but could not *price in the first letter* be made much more general?

Here is something else that I probably do not know anything about. The dye people, it seems to me, have put out in the past a great deal of very futile advertising. Everybody claims to have good dyes and a full line; and generalizations about the American industry are of some interest. Recently, however, there is a tendency to get down to real information, and the companies that announce new colors, give their properties and at the same time announce shade cards or publish lists of dyes for specific purposes are to be praised. Such information service is a step in the right direction. If, in addition, they could see their way clear to indicate the nearest Schultz numbers, names or prewar prototypes, the different materials for which each dye is especially useful, as well as numerous other data that are hard to think of until one happens to want them, wouldn't it be a real help in the selection and use of dyes?

There must be some conditions under which the properties of dyes can be more or less definitely defined, although nobody appears to know just what are the conditions or the properties either. Many conflicting statements are made and different salesmen for the same firm cannot always agree on the properties of their own colors. This, of course, is largely due to their own personal experience under different conditions.

There are now many fine shade cards available, but still we find instances where they do not check very well

with the dyes as delivered for use, and a few look as though some laboratory boy had taken what was most convenient for his dyeings.

Many purchasers act so foolish and secretive that they compel the dye salesman to fool them in order to sell them anything. It is a sorry state of affairs and tends to cause a great deal of waste and confusion. Probably we who think that we are onto the game should be a little more charitable if the dye salesman has cultivated bad habits from his past experiences.

Of all the strange things that a dye firm ever did it would seem as though the following would rank well up on the list: Dyeings of colors intended for a *textile fabric* were submitted on cotton rag *paper*, and as if this were not enough, they were subjected to ultra violet fading test equivalent to four hours of August sunshine. Both were horribly changed, but since the favored color did not go so red as the other it was pointed out as considerably faster to light. Not only the salesman but his house seemed to be woefully ignorant on things quite elementary.

This is not held up as characteristic of American dye firms, but it is more or less characteristic of some non-technical dye salesmen. There are plenty of men in the industry who know better, and we are led to wonder why there should be *any* who do not. As a suggestion for a cure, we propound the simple question: "Which is easier and better for all concerned, to try to batter technical sense into a salesman's head, or to inject sales sense into that of a technical man?" T. C.

Foreign Dyes Imported Through the Port of New York During March

Compiled by the Chemical Division of the Bureau of Foreign and Domestic Commerce, in Collaboration with the Chemical Division of the United States Tariff Commission

KEY TO ABBREVIATIONS FOR FOREIGN MANUFACTURERS

1—The Six Leading German Companies

A—Actien-Gesellschaft fur Anilin-Fabrikation, Berlin. Founded 1873. Branches in France and Russia.
B—Badische Anilin-und Soda-Fabrik, Ludwigshafen on the Rhine. Founded 1865. Branches in France and Russia.
By—Farbenfabriken vorm. Friedr. Bayer & Co., Leverkusen on the Rhine. Founded 1862. Branches in France and Russia.
C—Leopold Cassella & Co., Frankfort on the Main. Founded 1870. Branches in France and Russia.
K—Kalle & Co., A. G., Biebrich on the Rhine. Founded 1870. Branches in Russia.
M—Farbwerke vorm. Meister Lucius & Bruning, Hochst on the Main. Founded 1862. Branches in France and Russia.

2—The Seven Smaller German Companies

BK—Leipziger Anilinfabrik Beyer & Kegel, Furstenberg near Leipzig. Founded 1882.
GG—Chemikalienwerk Greishem G.m.b.H., Griesheim on the Main. Founded 1881.
CJ—Carl Jager G.m.b.H., Anilinfarbenfabrik, Dusseldorf. Founded 1823.
GrE—Chemische Fabrik Griesheim-Electron, Offenbach on the Main. Founded 1842.
L—Farbwerk Muhlheim vorm. A. Leonhardt & Co., Muhlheim on the Main. Founded 1879. Branch in France.
tM—Chemische Fabriken vorm. Weiler ter Meer, Uerdingen on the Rhine. Founded 1877.
WD—Wulfing, Dahl & Co., A. G. Barmen. Founded 1842.

3—Dutch, Belgian and French Companies

FA—Farbwerk Ammersfoort, Ammersfoort, Netherlands. Founded 1888.
NF—Niederlandische Farbe-und Chemikalienfabrik Delft, Netherlands (Delft). Founded 1897. Branch in Russia.
LG—Lazard Godchaux, of Brussels. (These products are probably compounded largely from the dyes made by A. Wiescher & Co., of Haeren, Belgium.)
P—Societe Anonyme des Matieres colorantes et produits chimiques St. Denis (formerly A. Poirrier), St. Denis, near Paris, France. Founded 1830.

4—Swiss Companies (all at Basel)

DH—Farbwerke vorm. L. Durand, Huguenin & Co. Founded 1871. Branches in Germany and France.
G—Anilinfarben-und Extract-Fabriken vorm. Joh. Rud. Geigy. Founded 1764. Branches in France, Germany and Russia.
I—Geselfschaft fur chemische Industrie. Founded 1885. Branch in France.
S—Chemische Fabrik vorm. Sandoz & Co. Founded 1887.

5—English Companies

BAC—The British Alizarin Co., Ltd. Established 1882.
ClCo—The Clayton Aniline Co., Ltd., Clayton, near Manchester. Founded 1876.
CR—Clauss & Co. (formerly Clauss & Ree), Clayton, near Manchester. Founded 1890.
CV—Colne Vale Chemical Co., Milnsbridge, near Huddersfield.
RHS—Read Holliday & Sons, Ltd., Huddersfield. Founded 1820. (Purchases by British Dyes, Ltd.)
BD—British Dyes, Ltd Founded 1915.
Lev—Levinstein, Ltd., Crumpsall Vale, near Manchester. Founded 1864.
Q—Importations of unknown source, through dealers in colors.

THE imports of coal-tar dyes for March, 1924, through the port of New York totaled 293,862 pounds, with an invoice value of $302,016. In addition to the above, imports of dyes reported from the port of Boston totaled 8,937 pounds, with an invoice value of $5,231. The average monthly import of dyes, according to the preliminary figures for the port of New York, during 1923 was about 220,000 pounds. The average monthly import of coal-tar dyes into the United States during the year 1922 was 331,000 pounds.

Imports Through the Port of New York

Month	Pounds	Value
January	228,743	$232,571
February	158,874	176,657
March	293,862	302,016

Five Leading Dyes by Quantity Imported

January—	Pounds
Indanthrene Blue RS	15,090
Helindone Pink R	11,500
Indanthrene Golden Orange R	10,791
Ciba Bordeaux B	9,792
Chlorantine Fast Brown	8,488

February—	
Algol Brown B	20,497
Erioglaucine	12,213
Indanthrene Golden Orange R	6,960
Algol Brown G	6,679
Phosphine	6,522
March—	
Fast Green	16,720
Algol Blue 3G	15,139
Indanthrene Golden Orange G	13,195
Indanthrene Golden Orange R	12,696
Indanthrene Blue GCD	9,666

Per Cent of Quantity by Countries of Shipment

	1924		
	Jan.	Feb.	Mar.
Germany	41%	44%	63%
Switzerland	32	35	15
Italy	6	8	6
Belgium	8	4	3
England	5	3	6
Canada	3	1	..
France	3	2	2
Holland	..	..	4
All others	2	3	1

Imports of medicinals, intermediates, photographic developers and other coal-tar chemicals totaled approximately 212,343 pounds, with an invoice value of $46,254, compared with 55,094 pounds, with an invoice value of $16,870, for February. The poundages are given as approximate, because certain of the medicinals were reported in ampoules, the exact weight of which is not known. The imports of carbolic acid (crystals) led this group with a total of 141,120 pounds, with an invoice value of $19,593, followed by Novadelox, with a quantity totaling 57,881 pounds.

The imports of color lakes during the month of March totaled 11,520 pounds, with an invoice value of $3,343. The imports of color lakes during February were 4,181 pounds, with an invoice value of $1,848.

The dyes in this report are grouped by Schultz numbers, and in the case of those which could not be identified by Schultz number the classification according to the ordinary method of application was adopted. As the pastes and powders of the vat dyes vary widely in strength and quantity, each vat dye has been reduced—in nearly every case—to a single-strength basis.

The designation of "†" for competitive and "*" for non-competitive indicates the appraisement basis for the assessment of the ad valorem duty in Paragraph 28 of the Tariff Act of 1922. Those dyes without designation are doubtful, pending further investigation.

The ad valorem rate for competitive dyes is based on the American selling price as defined in Subdivision (f) of Section 402 of Title IV; the ad valorem rate for non-competitive dyes is based on the United States value as defined in Subdivision (d) of Section 402 of Title IV of the Tariff Act of 1922.

Dyes of Coal-Tar Origin

The following table includes imports through the port of New York to the amount of 293,862 pounds, and also 8,937 pounds from Boston.

Schultz No.	Name of Dye and Manufacturer	Quantity (pounds)
6	Martius Yellow	100
	Martius Yellow Crystals—(A)	
19	Fast Light Yellow	110
	†Fast Light Yellow 2G—(By)	
22	Xylene Light Yellow	5,003
	†Xylene Light Yellow R Conc.—(S)	
28	Hansa Yellow G:	
	Hansa Yellow G Paste—(M)	2,000
	Hansa Yellow G Powder—(M)	500
38	Orange G	110
	Orange G—(By)	
81	Brilliant Cochineal	82
	Brilliant Wool Scarlet PG—(K)	
118	Geranine	410
	Geranine G—(By)	
140	Curcumeine	440
	*Chromocitronine R—(DH)	
158	Chrome Brown RR	551
	*Chrome Brown RVV—(G)	
175	Ponceau	440
	*Acid Ponceau E—(G)	
177	Mordant Yellow	200
	Milling Yellow GA—(A)	
182	Brilliant Sulphon Red	495
	†Fast Sulphon Violet 5BS—(S)	
183	Eriochrome Black T	100
	†Eriochrome Black T—(G)	
207	Diphenyl Fast Brown G	2,205
	Diphenyl Fast Brown GNC—(G)	
211	Resorcine Brown	335
	*Resorcine Brown F—(K)	
247	Scarlet	10
	Imperial Scarlet 3B—(By)	
264	Fast Sulphon Black	25
	†Fast Sulphon Black F—(S)	
265	Sulphon Cyanine Black	25
	†Sulphonine Black B—(S)	
273	Diaminogene Blue	564
	Diaminogene Blue NA—(C)	
284	Bismarck Brown 2R	3
	Vesuvine BLX—(B)	
296	Cotton Yellow	1,353
	†Benzo Fast Yellow RL—(By)	
319	Diamine Scarlet	500
	*Diamine Scarlet 3B—(C)	
326	Oxy Diamine Violet	500
	*Benzo Violet O—(By)	

Schult: No.	Name of Dye and Manufacturer	Quantity (pounds)
330	Zambesi Brown	50
	Zambesi Brown 4R—(A)	
358	Diphenyl Red	2,913
	*Aceto Purpurine 8B—(A)	
	Chloramine Red 8BS—(By)	
	*Chloramine Red 8BS Conc.—(By)	
	*Toluylene Red—(Gr.E.)	
363	Benzopurpurine 4B	200
	Cotton Red 4BX—(B)	
366	Delta Purpurine	440
	Delta Purpurine 5B—(By)	
392	Toluylene Orange	1,823
	*Pyrazol Orange G Conc.—(S)	
	Toluylene Fast Orange GL—(By)	
428	Direct Blue B	110
	Direct Brilliant Blue 8B—(I)	
456	Benzo Fast Blue	110
	Benzo Fast Blue 4GL—(By)	
493	Auramine	500
	†Auramine N Conc.—(S)	
505	Light Green (yellowish)	110
	†Acid Green GG Extra—(By)	
506	Erioglaucine	5,000
	*Erioglaucine EP—(G)	
512	Magenta	10
	Magenta Powder AB—(B)	
523	Fast Green	16,720
	*Fast Green Extra Bluish—(By)	
	Fast Green Extra Blue Shade—(By)	
528	Fast Acid Violet 10B	2,204
	†Kiton Fast Violet 10B—(I)	
530	Acid Violet	500
	Acid Violet C 10B—(B)	
537	Methyl Blue for Silk	112
	*Methyl Blue MBS Powder—(Gr.E.)	
543	Patent Blue	2,935
	†Brilliant Acid Blue V—(M)	
	†Patent Blue V—(By)	
	Poseidon Blue BGX Conc.—(B)	
545	Patent Blue A	1,456
	Poseidon (Neptune) Blue BR Ex.—(B)	
	†Brilliant Acid Blue A—(By)	
	†Brilliant Acid Blue FF—(By)	
546	Cyanol	110
	*Cyanol FF—(C)	
548	Acid Violet 6BN	300
	Acid Violet 6BNOO—(B)	
559	Victoria Blue B	917
	Victoria Blue B Base—(B)	
	Victoria Pure Blue BO—(B)	
571	Rhodamine 6G	165
	*Rhodamine 6GDN Extra—(B)	
	*Rhodamine 6GDN Extra—(By)	
573	Rhodamine B	1,189
	†Rhodamine B Extra—(Q)	
	Rhodamine B Extra Base—(B)	
	†Rosazeine B Extra—(M)	

Schultz No.	Name of Dye and Manufacturer	Quantity (pounds)
580	Fast Acid Violet B	200
	Fast Acid Violet B—(M)	
	Fast Acid Violet R—(M)	
603	Acridine Orange	1,762
	*Acridine Orange DHE—(DH)	
	*Brilliant Acridine Orange A—(DH)	
606	Phosphine	4,205
	†Patent Phosphine GG—(I)	
	Phosphine 3R—(A)	
609	Homophosphine	260
	†Corioflavine GOOO—(Gr.E.)	
618	Thioflavine T	1,300
	*Basic Yellow T—(C)	
	Basic Yellow TCN—(C)	
635	Modern Violet	660
	*Modern Violet—(DH)	
	*Blue TCD 1900—(DH)	
645	Gallazine	110
	Gallazine No. 90 Powder—(DH)	
659	Methylene Blue	13
	Methylene Blue BG Conc.—(B)	
661	Thionine Blue	500
	Thionine Blue Gold—(M)	
663	New Methylene Blue N	1,000
	New Methylene Blue N—(M)	
672	Azo carmine	1,795
	Azo Carmine GX—(B)	
	Rosinduline GXF—(K)	
679	Safranine	25
	†Safranine B Conc. Pure—(S)	
700	Nigrosine (soluble in water)	50
	Silver Gray P—(A)	
759	Anthraflavone G Paste	2,189
	*Anthraflavone GC Paste—(B)	
	Anthraflavone GC Powder—(B)	
	*Anthra Yellow GC Paste—(B)	
	Anthra Yellow GC Powder—(B)	
760	Indan. Gldn. Oran. G (sgle. stngth.)	13,195
	Helin. Gldn. Oran. IG Dbl. Pst.—(M)	
	Helin. Gldn. Oran. DIG Dbl. Pst.—(M)	
	Indan. Gldn. Oran. G Pst.—(B)	
	Indan. Gldn. Oran. G Dbl. Pst.—(B)	
	Vat Gldn. Oran. G Dbl. Pst.—(B)	
761	Indan. Gldn. Oran. R (sgle. stngth.)	12,696
	*Indan. Gldn. Oran. RRT Pst.—(B)	
	Vat Orange RRT Paste—(B)	
	Vat Orange RRT Paste (fine)—(B)	
762	Indanthrene Scarlet GS Powder	110
	Helindone Orange I 4R Powder—(M)	
765	Indan. Green B (sgle. stngth.)	5,465
	Helindone Black IBB Dbl. Pst.—(M)	
	†Indan. Black BB Dbl. Pst.—(B)	
	Indan. Black BB Extra Pdr.—(B)	
	Indan. Blue Green B Dbl. Pst.—(B)	
767	Indanthrene Violet RR Single Paste	5,410
	Vat Brilliantt Violet RR Paste—(B)	
	Vat Brilliant Violet RRT Powder—(B)	

Schultz No.	Name of Dye and Manufacturer	Quantity (pounds)
778	Alizarine, Synthetic	4,958
	Alizarine DIB New—(M)	
	Alizarine VI Extra Pure—(B)	
779	Alizarine Orange:	
	†Alizarine Orange Paste—(BAC)	2,611
	Alizarine Orange RP Paste—(By)	
782	Alizarine Brown	2,723
	*Anthracene Brown RD Paste—(G)	
785	Alizarine RG, GI	1,000
	Alizarine Red SDG—(M)	
787	Alizarine Bordeaux	500
	Alizarine Bordeaux BP Paste—(By)	
790	Anthracene Blue	200
	Anthracene Blue SWGG Powder—(B)	
792	Cibanone Orange R Paste	661
	Cibanone Green G Paste—(I)	
797	Alizarine Garnet	50
	Alizarine Claret R Paste—(M)	
798	Alizarine Maroon W	198
	Alizarine Maroon Paste—(B)	
813	Indanthrene Copper R Paste—(B)	137
816	Algol Red 5G (single strength)	792
	Vat Red 5GK Powder—(By)	
817	Algol Yellow R (single strength)	1,793
	Vat Yellow GK Paste—(By)	
	Vat Yellow GK Powder—(By)	
819	Algol Red FF, R (single strength)	5,256
	*Algol Red FF Extra Powder—(By)	
	Algol Red R Extra Powder—(By)	
	Vat Red R Extra Powder—(By)	
821	Algol Brilliant Violet 2B (sgle. stngth.)	896
	*Algol Brilliant Violet 2B Pdr.—(By)	
827	Indan. Claret B Ex. (sgle. stngth.)	2,338
	Anthra Claret R Paste—(B)	
	Anthra Bordeaux R Paste—(B)	
828	Indanthrene Claret B (sgle. stngth.)	880
	Indanthrene Claret B Powder—(B)	
831	Indanthrene Red BN (sgle. stngth.)	6,436
	*Duranthrene Red BN Paste—(BD)	
	Helindone Red DIBN Ex. Paste—(M)	
	Vat Red BN Extra Paste—(B)	
	Vat Red RK Paste—(B)	
832	Indanthrene Violet RN Paste	3,201
	*Indanthrene Violet BN Ex. Paste—(B)	
	Indanthrene Violet BN Ex. Pdr.—(B)	
	Vat Violet BN Extra Paste—(B)	
	Vat Violet BN Paste—(B)	
833	Algol Olive R (single strength)	5,864
	Vat Olive R Paste—(By)	
	Vat Olive R Powder—(By)	
834	Algol Gray (single strength)	3,772
	*Algol Gray 2B Paste—(By)	
	Vat Gray GK Paste—(By)	
	Vat Gray K Powder—(By)	
838	Indanthrene Blue RS (single strength)	2,394
	†Indanthrene Blue RS Triple Pdr.—(B)	
840	Indanthrene Blue 3G (sgle. strngth.)	2,200
	†Vat Blue 3G Paste—(B)	
	Vat Blue 3G Paste (fine)—(B)	
841	Indanthrene Blue GGS (sgle. stngth.)	6,208
	Indan. Blue GGSP Dbl. Pst.—(B)	
	Indanthrene Blue GGSZ Paste—(B)	
842	Indanthrene Blue GCD (sgle. stngth.)	9,666
	Indan. Blue GCD Dbl. Pst.—(B)	
	Indan. Blue GCD Dbl. Pst. (fine)—(B)	
	†Indan. Blue GCD Powder—(B)	
	†Vat Blue GCD Dbl. Pst. (fine)—(B)	
844	Algol Blue 3G (single strength)	15,139
	*Vat Blue 5G Paste—(By)	
	Vat Blue 5G Powder—(By)	
849	Indanthrene Yellow G (sgle. stngth.)	2,928
	Indanthrene Yellow G Dbl. Pst.—(B)	
	†Vat Yellow G Dbl. Paste (fine)—(B)	
852	Alizarine Irisol	330
	*Alizarine Blue JR Powder—(By)	
854	Alizarine Viridine	419
	*Alizarine Viridine FF Paste—(By)	
855	Alizarine Pure Blue	220
	*Alizarine Sky Blue B—(By)	
856	Alizarine Astrol	2,710
	*Alizarine Astrol B Powder—(By)	
	*Alizarine Blue AS Powder—(By)	
858	Alizarine Saphirol B	2,324
	†Alizarine Saphirol SE Powder—(By)	
860	Cyananthrol G	1,261
	Alizarine Direct Blue BGAOO—(B)	
	Cyananthrol BGAOO—(B)	
862	Alizarine Blue Black	4,089
	Alizarine Blue Black B Powder—(By)	
	Alizarine Blue Black B Powder—(M)	
863	Anthraquinone Blue Green	500
	Anthra. Blue Green BXO Pdr.—(B)	
865	Alizarine Direct Green G	210
	†Aliz. Cyanine Green G Ex. Pdr.—(By)	
867	Indanthrene Brown R (sgle. stngth.)	1,272
	†Anthra Brown B Double Paste—(B)	
869	Algol Brown B (single strength)	442
	Algol Brown R Powder—(By)	
	Vat Brown RT Paste—(B)	
870	Algol Corinth R (single strength)	864
	Vat Corinth RK Powder—(By)	
873	Helindone Brown AN (single strength)	100
	Helindone Brown AN Paste—(M)	
876	Indigo, White	110
	*Indigosol DH Powder—(DH)	
885	Brilliant Indigo B	2,193
	*Brilliant Indigo B Paste—(B)	
893	Alizarine Indigo G	597
	*Alizarine Indigo G Paste—(By)	
901	Ciba Violet B	882
	*Ciba Violet B Paste—(I)	

Schultz No.	Name of Dye and Manufacturer	Quantity (pounds)
902	Helindone Brown 2R (sgle. stngth.)	700
	*Helindone Brown 2R Powder—(M)	
904	Helindone Brown (single strength)	1,400
	*Helindone Brown G Powder—(M)	
907	Ciba Scarlet	1,433
	Ciba Scarlet G Extra Paste—(I)	
908	Ciba Red R	1,543
	*Ciba Red R Paste—(I)	
910	Helindone Pink (single strength)	1,382
	*Helindone Pink AN Paste—(M)	
	*Helindone Pink BN Paste—(M)	
912	Thioindigo Red B	1,456
	Ciba Pink BG Paste—(I)	
	Ciba Pink BG Powder—(I)	
913	Helindone Orange R	882
	*Helindone Orange R Paste—(M)	
917	Helindone Red B	500
	Helindone Red B Paste—(M)	
918	Helindone Red 3B	2,941
	*Helindone Red 3B Paste—(M)	
	Vat Red Violet RH Paste—(B)	
920	Helindone Violet (single strength)	1,354
	Helindone Violet B Paste—(M)	
	Helindone Violet R Powder—(M)	
923	Ursol	2,085
	Fur Brown PY—(A)	
	Fur Brown 4R Paste—(A)	
	Fur Yellow 4G—(A)	
	Nako PS—(M)	
	Nako PH—(M)	

UNIDENTIFIED DYES

Acid Dyes

Name of Dye and Manufacturer	Quantity (pounds)
Alizarine Leveling Blue BBS—(C)	50
Alizarine Rubinol	1,689
*Alizarine Rubinol 3G Powder—(By)	
*Alizarine Rubinol GW Powder—(By)	
Alizarine Rubinol R Powder—(By)	
*Brilliant Milling Blue B—(C)	500
*Brilliant Pure Yellow 6G Extra—(By)	220
Brilliant Wool Scarlet P3R—(K)	198
*Cloth Fast Red GRG—(I)	110
Guinea Fast Red:	
*Guinea Fast Red BL—(A)	1,700
Guinea Fast Red 2R—(A)	
†Polar Red G Conc.—(G)	882
Radio Yellow R—(C)	500
Sulphon Yellow 5G—(By)	110
*Supramine Brown R—(By)	220
Supramine Red	440
*Supramine Red B—(By)	
*Supramine Red 2G—(By)	
Wool Brown AF—(Q)	249
Wool Fast Blue BL—(B)	333

Vat Dyes

Name of Dye and Manufacturer	Quantity (pounds)
Algol Brown G (single strength)	4,202
Vat Brown G Paste—(By)	
Vat Brown G Powder—(By)	
*Alizarine Indigo Brown R Paste—(By)	97
Brilliant Indigo N—(B)	2
Helindone Pink R Extra Paste—(M)	5,000
*Hydron Orange RF Paste—(C)	187
†Hydron Pink FF Paste—(C)	330
*Hydron Scarlet BB (single strength)—(C)	330
†Hydron Yellow NF Paste—(C)	250
Indanthrene Black BGA (sgle. stngth.)—(B)	4
Indanthrene Blue BCD (sgle. stngth.)	2,000
Indanthrene Blue BCD Dbl. Pst.—(B)	
Indan. Blue BCD Dbl. Pst. (fine)—(B)	
Indanthrene Blue BCS (single strength)—(B)	1,755
Indanthrene Blue RZ (single strength)—(B)	4,214
Indanthrene Brown	822
*Indanthrene Brown 3R Paste—(B)	
*Helindone Brown IR Paste—(M)	
Vat Brown GG Paste—(B)	
Vat Brown RT Paste—(B)	
Indanthrene Green (single strength)	600
Vat Green G Double Paste—(B)	
Vat Green GG Double Paste—(B)	
Indanthrene Pink (single strength)	5,908
Indanthrene Pink B Double Paste—(B)	
Indanthrene Pink B Dbl. Paste (fine)—(B)	
Indanthrene Red Violet RRK (sgle. stngth.)	1,038
*Vat Red Violet RRK Paste (fine)—(B)	
Vat Red Violet RRK Powder—(B)	
Vat Yellow 3RT (single strength)	10
Vat Brilliant Blue R Paste—(B)	500

Mordant and Chrome Dyes

*Acid Alizarine Gray G—(M)	1,000
*Alizarine Emeraldole G Powder—(By)	310
*Alizarine Fast Gray 2BL—(By)	299
†Anthracene Chromate Brown EB—(C)	550
*Brilliant Chrome Blue 2B—(DH)	110
Chrome Fast Phosphine R—(DH)	55
Chrome Garnet B—(DH)	22
*Chrome Olive JCSB Powder—(DH)	110
*Chrome Printing Red Y—(DH)	220
Chrome Yellow CR—(G)	551
Chromorhodine	770
*Chromorhodine BN—(DH)	
Chromorhodine 6GN—(DH)	
*Chromoxane Brilliant Blue G—(By)	828
Eriochrome Cyanine RC—(G)	1,102
†Eriochrome Flavine A Conc.—(G)	2,425
*Eriochrome Green L—(G)	882
Metachrome Blue Black 2BX—(A)	1,500
*Metachrome Olive 2G—(A)	2,000

Direct Dyes

Name of Dye and Manufacturer	Quantity (pounds)
Benzo Fast Black L—(By)	832
Benzo Fast Bordeaux 6BL—(By)	1,001
Benzo Fast Brown 3GL—(By)	1,001
*Benzo Fast Heliotrope BL, 4BL—(By)	991
†Benzo Red 12B—(By)	110
*Benzo Rhodamine Red 3B—(By)	220
Brilliant Benzo Fast Violet BL—(By)	108
Brilliant Benzo Green B—(By)	149
*Brilliant Sky Blue 8G Extra—(By)	661
*Chloramine Violet FFB—(By)	711
Chlorantine Fast Yellow 4GL—(I)	1,874
*Chlorazol Fast Brown RK—(BD)	500
*Chlorazol Violet R—(BD)	500
Chrysophenine 2G Conc.—(Q)	55
Diamine Brilliant Blue G—(C)	35
Diamine Brilliant Violet B—(C)	20
Diamine Fast Brown GB—(C)	200
Diamine Fast Orange EG, ER—(C)	746
Diamine Orange F—(C)	2,000
*Diazo Brilliant Green 3G—(By)	220
*Diazo Fast Violet BL—(By)	576
Diazo Indigo Blue 4GL Extra—(By)	500
Diazo Sky Blue 3G—(By)	2,000
Fast Cotton Gray VL—(A)	100
Naphthamine Fast Brown BL—(K)	200
Rosanthrene Orange R—(I)	661
Zambesi Black	1,000
†Zambesi Black D—(A)	
Zambesi Black F—(A)	
Zambesi Red B Powder—(A)	220

Sulphur Dyes

*Cross-Dye Green B—(BD)	3,243
Pyrogene Cutch Brown RR Extra—(I)	2,205
Sulphide Violet V—(Q)	400
Sulphur Yellow G Extra—(A)	10
*Thional Brilliant Blue 6BS Conc.—(S)	2,001
†Thional Brown O—(BD)	4,000
Acridine Brown O Conc.—(Q)	55
Brilliant Acridine Orange R Conc.—(Q)	55
*Corvoline BT—(Q)	661
*Indoine A Extra Pure—(G)	220
Neophosphine G Conc.—(Q)	22

Spirit Soluble and Color Lake Dyes

Hansa Yellow 10G Paste—(M)	10
Hansa Yellow 10GT Paste—(M)	10
Hansa Yellow 10G Lumps—(M)	5
Helio Bordeaux BL Paste—(By)	399
Helio Bordeaux BL Powder—(By)	100
Lithol Fast Yellow 5G Lumps—(B)	215
*Paper Fast Bordeaux B—(By)	518
Typophor Black FB—(B)	100

Unclassified Dyes

Name of Dye and Manufacturer	Quantity (pounds)
*Blue III—(‡BC Ltd.)	222
*Blue V—(BC Ltd.)	90
*Brilliant Blue G—(By)	551
*Orange I—(BC Ltd.)	273
*Pure Yellow I—(BC Ltd.)	182
*Red III—(BC Ltd.)	360
*Solamine I—(BC Ltd.)	273
*Solamine II—(BC Ltd.)	273
Solamine III—(BC Ltd.)	91

‡British Celanese, Ltd.

Color Lakes of Coal-Tar Origin

Diamond Black Pigment	11,013
*Dry Yellow 70%	112
*Madder Pink FK	50
Red Lake	14
Violet Lake	331

Supplementary List of Classifications of Dyes for February

*Direct Brown
†Orseille Red
*Royal Blue
*Toupe Gray (Mole)
*Turquoise Blue
*Brilliant Violet Benzo B
*Helindone Red IBN Ex. Paste
*Helio Bordeaux BL Pst. 20%
*Helio Bordeaux BL Pdr.
*New Methylene Blue NS Conc.
*Paper Fast Bordeaux B 55%
*Algol Brilliant Violet R Powder
*Algol Olive R Paste
*Vat Olive R Pdr. (Algol)
†Alizarine Cyanine Green G Extra Powder
†Diamine Fast Orange EG
*Diamine Scarlet 3B
*Hydron Orange RF Pst.
*Rose Induline 2B
*Tannin Orange R Pdr.
*Cyanole FF
*Rhodamine 6G Extra
†Madder Lake VN 14

GERMAN DYE OUTPUT IN FEBRUARY

Production of coal-tar dyes in German during February was as follows:

By Classifications

Group	Pounds
1—Alizarine Red	1,190,160
2—Indigo paste	4,760,640
3—Vat colors, except Indan. Blue GCD.	687,648
4—Indanthrene Blue GCD	26,448
5—Alizarine colors other than red	185,136
6—Direct colors for cotton	1,613,328
7—Direct colors for diazotization	264,480
8—Acid colors for wool	1,428,192
9—Chrome colors for wool	387,904
10—Basic colors	775,808
11—Sulphur colors	3,967,200
12—Lake colors	458,432
Total	15,745,376

Technical Notes from Foreign Sources

Washing of Wool and Its By-Products

A very interesting and detailed article is published in the South African Journal of Industry, Vol. 6, No. 5, pages 204-210, on the washing of wool and its by-products. The first part of the article discusses in detail the nature and the properties of the woolen fiber both from the chemical as well as the microscopical and physical standpoints. The next section deals with the various impurities that are found mixed with the woolen fiber, the chemical and physical properties of the wool grease, as well as its chemical composition. The third division of the article deals with the processes of washing wool, the characteristics of the same, the results that are obtained by their application, the products that are recovered, etc. The processes that are described are the use of water and different detersive compositions in washing the wool, the extraction of the impurities by the aid of solvents which are then volatilized and recovered, and finally washing by means of substances which remove the grease by mechanical action.

Discharging Vat Dyestuffs in Textile Printing

A process has been patented by the British Alizarine Company, in British Patent No. 209,888, in which vat dyes are discharged in the printing of textile fabrics. Satisfactory discharges on fabric dyed with sulphurized indophenol carbazole dyestuffs—for example, Hydron Blue—are obtained by impregnating the dyed fabric with calcium acetate, afterward printing on it a paste containing 4 parts of British gum, 3 parts of glycerine, 24 parts of water, 7½ parts of sodium acetate, 17½ parts of formosul (sodium hydrosulphite-formaldehyde), 27 parts of leucotrope, 10 parts of zinc stearate and 12 parts of calcium acetate. Then the fabric is steamed for a period of twenty minutes at a temperature of 130 deg. Cent. It is essential that the steaming be carried out at a temperature higher than 100 deg. Cent.

Changes in Cotton Fabrics During Calendering and Beetling

Two fabrics were examined and followed through the calendering process. One fabric had been woven from long-stapled Sea Island cotton and the other from American cotton. The two fabrics were subjected to cold and hot calendering, beetling and embossing. The changes that were produced in their ripping and tensile strains were measured.

Hot calendering increased both warp and weft ripping strains. These were found to be 37.8 and 51.3 per cent respectively after forty nips, 73 and 84.2 per cent respectively after 4,000 nips, for Sea Island cotton, and 11.8 and 28.2 per cent respectively after forty nips for American cotton. However, the warp and weft tensile strains gradually decreased during prolonged calendering. Cold calendering also increased the ripping strain, but the weft was considerably less affected than the warp.

The tensile strength of fabrics is not affected by cold calendering. During beetling, care being taken to prevent the fabric from becoming dry, the tensile strain was almost unaffected, but the ripping strain after gradually increasing during the first twenty hours subsequently decreased. The increase in the ripping strain of starched fabric during hot calendering was more regular, but less than that of unstarched fabric.

When the fabric was embossed 144 lines per inch, a marked increase in the ripping strain occurred, but the corresponding decrease in the tensile strength was greater than that observed during the hot calendering process. Under similar conditions the starched fabric was less affected. The behavior of starched fabric during embossing is dependent on the amount of starch which it contains. The iodine absorption of cotton gradually increases during prolonged calendering and beetling, and this treatment also influences the color, which changes from blue to brown, assumed by the cotton when immersed in a solution of iodine. The diameter of cotton fibers was increased by calendering and beetling, and in some instances the fibers resembled mercerized fibers.

The original article from which this abstract is taken appeared in the Journal of the Society of Dyers and Colorists, 1924, pages 5 to 10.

Azo Dyes Capable of Being Chromed

The Society of Chemical Industry in Basle has been granted British Patent No. 193,385 on a process of making azo dyestuffs which are capable of being chromed. These dyestuffs, which are used on wool and which yield, after chroming, pure black shades of excellent fastness to light, fulling and potting, are obtained by coupling alpha amino-5-hydroxyl-naphthalene-7-sulphonic acid with the diazo compound of a non-sulphonated 4-nitro-2-aminophenol or 6-nitro-2-aminophenol in the presence of calcium hydroxide.

For example, 24 parts of 1-amino-5-hydroxynaphthalene-7-sulphonic acid are dissolved in 150 parts of water containing 10 parts of calcium hydroxide, which are mixed with an aqueous suspension at a temperature varying from zero to 5 deg. Fahr., containing the diazo compound prepared from 15.5 parts of 4-nitro-2-aminophenol, 155 parts of hydrochloric acid and 7 parts of sodium nitrate in 300 parts of water.

Under these conditions coupling takes place at once and the dyestuff is then acidified or salted out and filtered off. 4-nitro-2-aminophenol, 4-nitro-6-chloro-2-aminophenol, 6-nitro-4-chloro-2-aminophenol, 6-nitro-4-methyl-2-aminophenol and 4-nitro-6-methyl-2-aminophenol, when used as diazo compounds, yield respectively (direct dyeing) brownish violet, dark blue, dark blue, reddish blue and violet brown colors, and, after chroming, greenish deep black, greenish deep black, bluish deep black, blue black and deep black shades.

Dyestuff Tables

A List of the Principal American-Made Colors with Their Properties and Fastness Characteristics

[NOTE: The publishers of The REPORTER have secured more or less complete data in regard to many of the dyestuffs which are at the present time being manufactured in the United States. As the following material has been brought together from various sources, they realize that errors are quite likely to appear, and it is earnestly requested that any readers who find errors or who are able to give additional information will communicate with the publishers in order that this material may be made as correct, complete and up to date as possible. These tables will appear serially until all colors upon which we have data shall have been covered.]

ALIZARINE YELLOW G

(Schultz No. 48)

COMPOSITION: Mono azo.

SPECIALLY SUITABLE FOR: Cotton printing and wool dyeing.

USUAL METHOD OF DYEING: Top chrome, chrome mordant and chromate. Works best and gives best color value when dyed top chrome.

SHADE: Similar to Chrome Yellow D (S-177).

SOLUBILITY: Very good.

LEVEL: Does not work level in light shades by the chromate or chrome-bottom methods.

EXHAUSTS: Better than Schultz No. 177.

FASTNESS TO:

Acid: Better than Chrome Yellow D (S-177).
Alkali: Good.
Carbonizing: Fair.
Fulling: Better than Chrome Yellow D; tints wool a little. Anthracene Yellow C (S-294) is better.
Light: Good; suitable for men's wear.
Rubbing: Fair.
Steaming: Excellent.
Sulphur: Shade goes greener.
Washing: Similar to Chrome Yellow D; very good.

OTHER PROPERTIES: Used in combination with Chrome Blue-Black (S-181). On pieces this color gives a very fast black for men's wear.

DYED BY OTHER METHODS: Silk-white process: the silk is stained. Chromate does not dye level.

ON OTHER MATERIALS: Cotton-effect threads are stained. Good on velour hats; dyes from a slightly acid bath.

PRINTING: On cotton with acetate of chrome.

COMPETING PRODUCTS: Made in the United States by Amalgamated Dyestuff & Chemical Works (Selling Agents, John Campbell & Co.); Calco Chemical Company; Consolidated Color & Chemical Company; Grasselli Chemical Company; American Aniline Products; E. I. du Pont de Nemours & Co.; Hub Dyestuff Company; Noil Chemical & Color Works; National Aniline & Chemical Company; Cincinnati Chemical Works.

PARANITRANILINE RED

(Schultz No. 56)

COMPOSITION: Mono azo lake.

REMARKS: Insoluble azo colors made from paranitraniline, coupled with beta-naphthol. The lakes are fast to water, alkali and acid. They possess good fastness to light, but are soluble in spirits and oil. The shade is a bright yellowish red adapted for oil paints and for book and lithographic printing. Not well adapted for wall-paper shades, because the shades show only a dull red.

COMPETING PRODUCTS: Made in the United States by the G. Siegle Corporation.

CHROMOTROPE 2B

(Schultz No. 57)

COMPOSITION: Mono azo.

SPECIALLY SUITABLE FOR: Wool.

USUAL METHOD OF DYEING: Acid and top chrome.

SHADE: Direct is bluish red. On chroming becomes a blue-black.

SOLUBILITY: Good.

LEVEL: In medium and dark shades.

FASTNESS TO:

Acid: Fast.
Alkali: Moderate.
Carbonizing: Fast.
Fulling: Not fast.
Light: Stands fourteen days without change in shade.
Potting: Not fast.
Rubbing: Fast.
Steaming: Fast.
Sulphur: Fast.
Washing: Not fast.

COMPETING PRODUCTS: Made in the United States by Butterworth-Judson Corporation.

ALIZARINE YELLOW R
(Schultz No. 58)

COMPOSITION: Mono azo.

SPECIALLY SUITABLE FOR: Wool.

USUAL METHOD OF DYEING: Top chrome, chrome mordant and chromate.

SHADE: Very orange shade of yellow.

SHADE BY GASLIGHT: Redder.

SOLUBILITY: Not very soluble.

LEVEL: Good.

EXHAUSTS: Slowly.

FASTNESS TO:
Acid: Fast.
Alkali: Turns somewhat redder.
Carbonizing: Not fast.
Chlorine: Fairly good; turns lighter.
Fulling: Moderate; bleeds onto white wool and white cotton.
Ironing: Temporarily redder.
Light: Stands fourteen days without change.
Perspiration: Fast.
Potting: Not fast.
Rubbing: Rubs slightly when dyed chromate.
Sulphur: Yellower.
Washing: Fair.
Finishing: Goes yellower.

DYED BY OTHER METHODS: Silk-white process: the silk is stained. Chromate exhausts well, though in order to form a complete lake it is necessary to boil for two hours. Where a neutral chromate mordant is used it is best to add one-half the amount to the bath at the start and the remainder after boiling an hour.

ON OTHER MATERIALS: White-cotton-effect threads are stained. Suitable for leather, chrome-tanned.

PRINTING: On cotton with acetate of chrome: prints level with difficulty.

COMPETING PRODUCTS: Made in the United States by Amalgamated Dyestuff & Chemical Works (Selling Agents, John Campbell & Co.); American Aniline Products Corporation; Butterworth-Judson Corporation; Calco Chemical Company; Cincinnati Chemical Works; Consolidated Color & Chemical Company (Selling Agents, H. A. Metz & Co.); E. I. du Pont de Nemours & Co.; Grasselli Chemical Company; Hub Dyestuff Company; Newport Chemical Works; United States Color & Chemical Company.

VICTORIA VIOLET
(Schultz No. 61)

COMPOSITION: Mono azo.

SPECIALLY SUITABLE FOR: Wool, particularly piece dyes.

USUAL METHOD OF DYEING: Acid.

SHADE: Violet.

SHADE BY GASLIGHT: Redder.

SOLUBILITY: Good.

LEVEL: Not very level; dyeing requires care.

EXHAUSTS: Well.

FASTNESS TO:
Acid: Moderate; sulphuric 1/10 turns it redder.
Alkali: Moderate; turns a dull red to brown.
Carbonizing: Not fast.
Fulling: Not fast; bleeds badly.
Ironing: Fast.
Light: Moderate; fades reddish.
Perspiration: Moderate.
Rubbing: Excellent fastness.
Steaming: Fast.
Sulphur: Fast.
Washing: Moderate; bleeds off.
Water: Moderate.

ON OTHER MATERIALS: On gloria the silk is stained a light lavender. Cotton-effect threads are left white.

PRINTING: On wool, prints good, though not fast to washing or water.

DISCHARGING: Discharges yellowish with tin crystals. Hydrosulphite not suitable.

COMPETING PRODUCTS: Made in the United States by Amalgamated Dyestuff & Chemical Works (Selling Agents, John Campbell & Co.); Cincinnati Chemical Works; E. I. du Pont de Nemours & Co.; Newport Chemical Works; Passaic Color Corporation; National Aniline & Chemical Company; Garfield Aniline Works.

LANAFUCHSINE
(Schultz No. 64)

COMPOSITION: Mono azo.

SPECIALLY SUITABLE FOR: Wool.

USUAL METHOD OF DYEING: Acid.

SHADE: Similar to Azo Fuchsine (S-146).

SHADE BY GASLIGHT: Yellower.

SOLUBILITY: Averages 22 parts per 1,000.

LEVEL: Excellent; can be added at the boil.

FASTNESS TO:
Acid: Fast.
Alkali: Fast to ammonia and soda.
Carbonizing: Fairly fast; the shade goes a little duller.
Fulling: White cotton is stained badly; white wool not as much.
Ironing: Fast.
Light: Same as Azo Fuchsine.
Perspiration: Fast.
Rubbing: Fast.
Steaming: Fast to dry steaming.
Street Dirt: Good.
Sulphur: Fast.
Washing: Fairly fast.

(*Continued on page* 278)

Practical Hints on the Production of Bright Colors on Textile Fabrics

Part III

Padding Paste Formulas—The Plant Required—Special Type of Padding Machine—The Work on the Plant—Possible Improvements—Special Padding Baths

By RAFFAELE SANSONE

IN the production of bright shades with direct dyes the padding machine plays at present a very important part, and is often quite indispensable for treating certain material. Very bright effects are obtained with such colors as Erica, Benzopurpurine 4B, Direct Fast Scarlets, Direct Orange Browns, Chicago Blue 6B, Chrysophenine G, etc., by padding these on light bleached cotton fabrics in a paste containing a large quantity of china clay (kaolin), precipitated aluminum oxide, or an aluminate of sulphated oil.

A recipe sometimes employed is as follows: 10 to 20 parts of the direct dyestuff are dissolved in 250 parts of water, and the resulting solution is mixed with 600 parts of a 6 per cent gum dragon paste. To this mixture is then incorporated, with the necessary precautions, and while warming, 100 parts of slightly alkaline hydrate of alumina, stirring then the mixture till cold. The material is padded with the above paste, and then dried. In this way goods of a certain consistency are obtained, possessing, however, little fastness to washing. The paste can produce light shades only.

A Cheaper Paste

The above paste, although giving good results when properly applied in the production of certain classes of goods, is rather expensive, besides requiring some trouble in the preparation of the aluminum hydrate. It is often substituted by a paste prepared as follows: 12 parts of cold farina are incorporated slowly with 600 parts of water containing 6 parts of prepared oil (sulphated oil) and 5 parts of glycerine; the resulting dough is warmed, during continual agitation, until a uniform paste has been formed, to which is then added from 10 to 20 parts of the direct coloring matter, warming further for a short period of time to assure the thorough mixture of the coloring matter, and applying at once on the fabric.

Another recipe for a coloring paste sometimes padded on cotton cloth is as follows: 10 to 20 parts of the substantive coloring matter are dissolved in 600 liters of water, and the resulting solution is mixed cold with 12 parts of wheat starch, 4 parts of farina and 20 parts of china clay (kaolin). The dough thus formed is then warmed to make a uniform semi-transparent paste, to which is added 1 part of olive oil soap.

With the above bath very light cotton goods are generally padded twice, dried on a cylinder drying machine, dampened on a special machine, left one day heaped up, then treated warm on a friction calendar.

The Plant Required

The plant required for the production of the above class of material, although differing very greatly in different mills, is based usually on the principle shown in Fig. 1.

This shows a padding machine (P), behind which is placed a rapid drying machine (D). The first has three pressing rollers (a, b, c), driven by a flywheel (V), turned by a leather belt and pulley (U), placed before the drying machine, and driven directly by a steam engine (E), which also drives the drying machine itself.

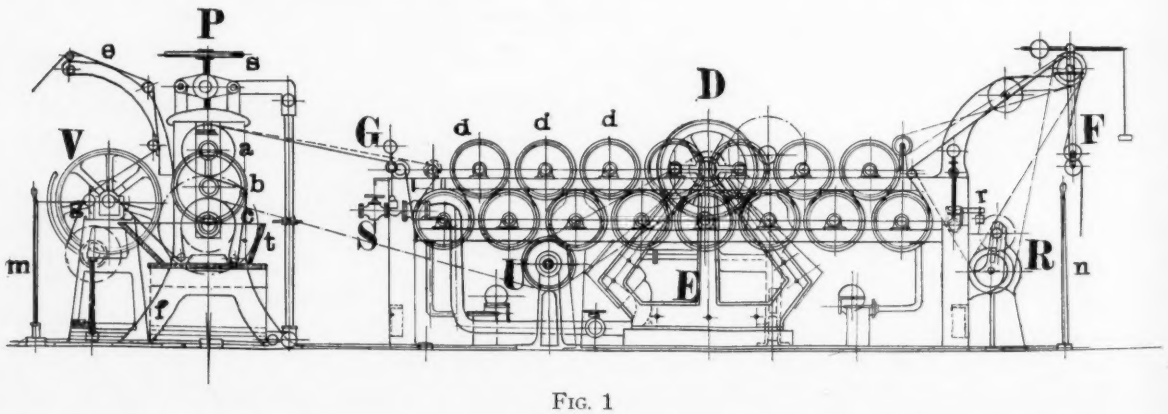

Fig. 1

The padding machine (P) is of specially strong construction, and its solid iron frame (f) supplies the three bowls (a, b, c) with a heavy elastic pressure, regulated by an upper screw wheel (s), levers and weights. Before it is a firm entering mechanism (e), having several lined copper bars, by which two separate pieces can be introduced simultaneously without overlapping one another, being freed of all plaits or folds. On leaving this the cloth descends, and before entering the impregnation trough (t), is supplied with a regulated tension by a special arrangement (g). Owing to the necessity of sometimes introducing the fabrics to be padded from wooden shafts, on which they have been rolled during other operations in the mill, the machine is also supplied, on its lower portion, with an entrance arrangement for these shafts.

The trough (t) is fitted solidly to frame f, and contains two lower guiding rollers and a discharge tube. Its form is specially regulated to facilitate the treatment of the material and uses only small quantities of bath, giving two impregnations. In some plants a conveniently placed steam heating coil is supplied. In trough t, revolves the pressing bowl (c), which in some machines is of cotton; this allows back starching and slop padding.

The rapid drying apparatus (D) contains fifteen gun metal, or iron copper plated drying cylinders (d, d, d, d), also of solid constructon. The axes of these cylnders are of rather large size, and revolve in special bearings, placed on two pairs of supporting arms, fitted solidly to a heavy iron frame. Through such bearings the interiors of the cylinders are heated by waste steam entered from tap S, coming from the steam engine (E).

To the left of the cylinders (d, d, d, d), is a special guiding arrangement (G), which also regulates the tension on the cloth, while at the opposite end is a safety valve (r) with a weight, an arrangement for rolling the dry cloth on wooden shafts, and mechanism (F) for plaiting this in the form of pieces should it be required. The whole plant is put in movement, or stopped, by moving one of the hand levers (m and n).

Special Type of Padding Machine

A machine sometimes employed for the preparation of the above class of goods, which offers special advantages, is constructed on the principle shown in Fig. 2.

This shows a strong iron frame, supporting two pairs of heavy pressing rollers (P and Q), the lower units of which are of copperplated iron, while the above are of iron covered over with India rubber. Such rollers are kept under a certain pressure by special levers and the weights K and L. Above them the frame rises to a certain height, branching off into two arms (A and B), on the first of which (A), the cloth is entered from above on three lined copper bars which spread it and smooth out all plaits or folds; the other arm contains a special mechanism (M) for dropping the padded cloth onto a low table, or small wagon, in pieces ready for delivery to the drying and finishing department.

Adjoining the machine is a special arrangement (E) for producing a certain tension on the fabric before it descends into the trough of treatment (J). This last is of rectangular shape, and is supplied with several upper and lower guiding rollers, a long closed copper steam heating coil, and a large discharge tap. This trough can be either of glass or enameled iron. In it the material to be padded is impregnated and pressed twice, and the time it is in the bath is more than double that required by some of the commonly used padding machines.

The machine is driven by a powerful electric motor, coupled to a solid iron shaft, having a step pulley, that by a leather belt drives another step pulley moving the lower roller of the pair Q. This in its turn drives the roller just above and the rest of the plant through other pinion wheels and driving arrangements.

The Work on the Plant

The operators of this plant require some training, as the desired result depends on regulating the pressure by increasing the number of the weights (K L), or reducing them; on preparing the padding paste, to its proper consistency, on the speed of the machine or on other similar details.

A method of working the plant would be as follows: The operators pass through the tension arrangement E the beginning of a cotton tape, and then run it over the upper and lower guiding rollers in trough J, until it reaches just below the first pair of squeezing rollers (Q), and is drawn between the nip of these which have been freed of all pressure; it is then carried downward onto the second lot of guiding rollers where it passes several times up and down, and reaching below the second pair of squeeze rollers (P), enters at the back and mounts upward into the plaiting arrangement M. When this has been accomplished the operators sew the end of the cotton band to the beginning of the cloth be padded, after this has been passed through the spreading bars on arm A.

After this the bath of treatment is run into trough J, warmed to the required degree, and the machine moved sufficiently to bring the cloth to the nip of the first pair of squeeze rollers (Q); where the operators free the fabric of all plaits or folds it may have formed while

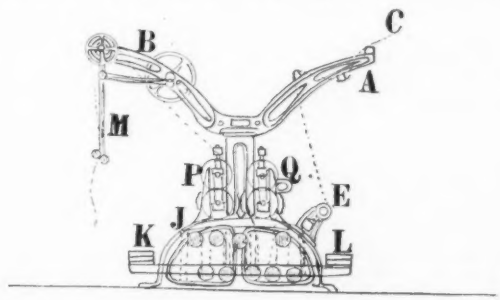

Fig. 2

entering trough J and in passing over the guiding rollers. When this has been accomplished they start the machine.

The cotton fabric thus passes continuously through the warm padding bath, taking up before the first squeeze cylinders enough of this bath to wet it completely. On passing through the bath again after the pressing, it is given the full charge of color and size; the second pair of squeeze rollers (P) complete the treatment and fix definitely the amount of color and filling to be retained.

Improvement of the Plant

The above described plant gives excellent results in many large mills, and by its means produces bright effects with direct dyes. There is no doubt, however, that by a very slight modification its value could be increased, especially for the treatment of lighter goods, and those goods which it is desired to give a fuller filling and deeper coloring. This modification would consist in causing the padded material, on leaving the first pair of pressing rollers (Q), to run upward on a cylinder drying machine, which dries the first charge of size and color before the cloth receives the second charge; this intermediate drying permitting the taking up of a much larger quantity of color and filling, producing much darker shades than would otherwise be possible when working the plant ordinarily.

Special Padding Baths

In those cases where it is not wished to thicken the material in any way, but simply to produce on it as bright a shade as possible, this is padded with a bath containing 0.5 to 1 part of the coloring matter and 5 parts of phosphate of soda per 1,000 parts water, drying, after this, either on the chain drying machine or on any ordinary cylinder drying machine. With some recipes one-half of the phosphate of soda is substituted with three parts of olive oil soap or odorless cotton seed oil soap.

There are, however, cases where a bath is similar to the above, but which has in addition a certain quantity of thickening agent. A recipe sometimes used is as follows: 40 parts of the direct coloring matter are dissolved in 800 parts of water, and to the resulting solution are added 30 parts of phosphate of soda, mixing in the bath while still warm, and with constant stirring, a thickening paste prepared by boiling 60 parts of wheat starch and 40 parts of dextrine with 100 parts of water.

(*To be continued*)

NEW DUNKER & PERKINS CARD

Dunker & Perkins Company have ready for distribution their new color cards, showing a line of direct, basic and sulphur colors. Included in this card are specialties manufactured by Noil Chemical & Color Company, Peerless Color Company and Beaver Chemical Corporation, for whom they are the exclusive New England agents.

The card is very attractively arranged and displays the different colors to advantages. Dyeing instructions are also given.

DYESTUFF TABLES

(*Continued from page 275*)

DYED BY OTHER METHODS: Silk-white process: the silk remains almost white. Top-chromed: the fastness is no better.

ON UNIONS: Cotton-wool dyed neutral, not suitable; dyed acid, the cotton is somewhat tinted.

ON OTHER MATERIALS: Silk: Can be dyed with boiled-off liquor and acetic acid.

PRINTING: Suitable for wool printing and gives shades similar to Azo Fuchsine (S-146). Printed direct with acid, it can be discharged with tin crystals or zinc dust. Hydrosulphite also discharges it white.

COMPETING PRODUCTS: Made in the United States by Sherwin-Williams Company.

AZO CORALLINE

(Schultz No. 65)

COMPOSITION: Mono azo.

SPECIALLY SUITABLE FOR: Wool.

USUAL METHOD OF DYEING: Acid; 10-15 per cent Glauber salt and 2-3 per cent sulphuric.

SHADE: Brownish red.

SHADE BY GASLIGHT: No change.

SOLUBILITY: Good.

LEVEL: Not at all level.

FASTNESS TO:

Alkali: Good.
Carbonizing: Shade goes bluer.
Fulling: Not fast.
Steaming: Fast.
Sulphur: Fast.
Washing: Not fast.

OTHER PROPERTIES: Used for combination shades on woolen yarns.

COMPETING PRODUCTS: Made in the United States by Grasselli Chemical Company; Garfield Aniline Works.

Note.—In publishing the Dyestuff Tables in the March 24th issue of The Reporter the name of John Campbell & Co. was inadvertently omitted, under Competing Products, from the list of those who manufacture Chrysoidine Y (Schultz No. 33). John Campbell & Co. make Schultz No. 33 under the name of Mohawk Orange G.

On May 1st the Arkansas Company, Inc., with offices now at 253 Broadway, will move to the Woolworth Building, 233 Broadway, New York City.

PROMINENT SPEAKERS TO BE PRESENT AT DINNER TO FRANCIS P. GARVAN

American medicine, American business and the national defense will take part with American chemistry in honoring Francis P. Garvan at a testimonial dinner by eight national organizations of chemists to be given him on Saturday evening, April 26, 1924, at the Waldorf-Astoria.

Dr. George David Stewart, president of the New York Academy of Medicine, is eminently well qualified to occupy the place of honor on the program of the evening as the representative of the medical profession, the builders of the health of the nation. Chemistry's contributions to medicine will be his subject. Elon H. Hooker, president of the Manufacturing Chemists' Association, will speak of chemistry's contributions to the wealth of the nation. Brigadier-General Amos A. Fries, chief of the Chemical Warfare Service, U. S. A., will discuss chemistry's contributions to the security of the nation. Thus will be set forth by particularly well qualified experts in each field the important part played by chemistry in "the health, wealth and security of the nation."

American chemists, through whom Mr. Garvan has contributed so largely to American life, will be represented by Dr. Edgar F. Smith, for many years provost of the University of Pennsylvania and past president of the American Chemical Society, who will act as toastmaster, and by Dr. Leo H. Baekeland, now president of the American Chemical Society, the largest organization of scientists in the world.

The invitations to the dinner are being signed by the presidents of the eight national organizations of American chemists: The American Chemical Society, the American Electrochemical Society, the American Association of Textile Chemists and Colorists, the American Institute of Chemical Engineers, the Chemists Club, the Manufacturing Chemists Association, the Synthetic Organic Chemical Manufacturers Association and the Salemen's Association of the American Chemical Industry. This gathering of men and women will be truly national in its make-up and will signalize Mr. Garvan's lasting contributions to American chemical education, research and industry through his efforts as Alien Property Custodian and later as president of the Chemical Foundation. The essential contributions of chemistry to American life, the building in America of a great self-contained chemical industry and the prospect of further progress in years to come through the application of this fundamental science to human problems which have been so largely aided by his patriotic and unselfish efforts will be emphasized.

A reception will precede the dinner at which chemists and distinguished guests from all parts of the country will have an opportunity to meet the guest of the evening.

The Providence office of S. R. David & Co., Inc., has moved from 76 Dorrance Street to 95 Fountain Street.

ANILINE COLOR & CHEMICAL ADDS SAN FRANCISCO OFFICE

The Aniline Color & Chemical Company, of Chicago, announces that it has taken over the office and laboratory of the Associated Color & Chemical Company, located in San Francisco. D. F. Driscoll, former branch manager of the Dyes Distributing Corporation, and manager of the Associated Color & Chemical Company, has been retained as Pacific Coast manager. Full stocks of imported and domestic colors will be carried.

Lockwood, Greene & Co. have issued a well-prepared 40-page booklet "written for the men in charge of industrial plants and for the men in charge of their power plants" entitled Industrial Power Plants. The booklet is attractively illustrated with photographs and diagrams of various industrial plants throughout the country, and its text deals interestingly with the different power units and with the business of construction engineering in general.

The American Dyewood Company have closed an important contract with the Bethlehem Shipbuilding Corporation, authorizing the latter company to distribute to the marine trade the new fire foam stabilizer "Amdyco," a recent development of the American Dyewood Company.

Walter Denman, European representative for Ellis Jackson & Co., Philadelphia, was a visitor at the American office of the company last week. He has been in the United States for about two weeks, returning early this week to Antwerp where he makes his headquarters.

CORRECTION

In connection with an article, entitled "The Coloring of Paper," by Norman Clark, which was published in the March 10th issue of The Reporter, the make-up editor failed to include a note in which Mr. Clark gave credit to Leonard Mann for an article along similar lines written by Mr. Mann and published originally in Dyestuffs and copyrighted by the National Aniline & Chemical Company, Inc.

We wish to take this opportunity of offering our apologies for this oversight.

MATHIESON ALKALI-ARNOLD, HOFFMAN LITIGATION

After pending for nearly three years, litigation proceedings have been started at Providence between Arnold, Hoffman & Co. and the Mathieson Alkali Works. James H. Higgins, acting as master, has completed a report of his findings in the suit, which he has rendered to Judge Brown, of the United States District Court in that State, who will now proceed with the case.

Five years ago the Mathieson Alkali Works ceased business transactions with Arnold, Hoffman & Co., who had acted as selling agents for Mathieson products for forty years. A year later the Mathieson company was sued in Providence by Arnold, Hoffman & Co., charged with various breaches of contract.

Counter-suits were brought later against Arnold, Hoffman & Co. and several of its individual directors in both New York and Providence courts by the Mathieson Alkali company, which charged that certain transactions with Arnold, Hoffman & Co. had justified them in breaking connections.

The decision arrived at by Referee James Higgins states that the Mathieson Alkali Works were aware of those transactions of Arnold, Hoffman & Co. against which Mathieson's claims are laid; that directors of the Mathieson corporation possessed full knowledge of factory records and contract terms between the companies, and therefore could not recover damages for which they are suing.

There are several important questions to be settled yet in the case, and in addition the trials of the cases filed in New York have been indefinitely postponed until those in Providence are satisfactorily decided.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912, OF AMERICAN DYESTUFF REPORTER.

Published bi-weekly at New York, N. Y., for April 1, 1924.

State of New York, County of New York, ss.: Before me, a notary public in and for the State and county aforesaid, personally appeared Alfred P. Howes, who, having been duly sworn according to law, deposes and says that he is the publisher of the American Dyestuff Reporter, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor and business managers are:

Publisher—Alfred P. Howes, 4109 Woolworth Building, New York City. Editor—Louis A. Olney, Lowell, Mass. Managing Editor—None. Business Manager—Alfred P. Howes, 4109 Woolworth Building, New York City.

2. That the owners are: Howes Publishing Company, Inc., 4109 Woolworth Building, New York City; Louis A. Olney, Lowell, Mass.; Alfred P. Howes, 4109 Woolworth Building, New York City; Derfla H. Collins, Upper Montclair, N. J.; Mary K. Howes, Northampton, Mass.; N. H. Hiller, Carbondale, Pa.; William F. Collins, Upper Montclair, N. J.; Jos. L. Schroeder, Hartsdale, N. Y.

3. That the known bondholders, mortgagees and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association or corporation has any interest direct or indirect in the said stock, bonds or other securities than as so stated by him.

A. P. Howes, Publisher.

Sworn to and subscribed before me this 20th day of March, 1924.

[Seal] Arthur K. Bryce.

(My commission expires March 30, 1925.)

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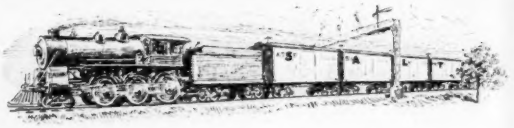

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